DOCUMENT RESUME

ED 105 080 CE 003 305

TITLE Modular Design Approach for Agricultural Education.

INSTITUTION New York State Education Dept., Albany. Bureau of Secondary Curriculum Development.

PUB DATE 74

NOTE 64p.; For the Module Directory, see CE 003 992

EDRS PRICE MF-$0.76 HC-$3.32 PLUS POSTAGE

DESCRIPTORS *Agricultural Education; Classification; Curriculum Design; Curriculum Development; Educational Programs; Evaluation Methods; Program Administration; *Program Design; *Program Development; Program Evaluation; *Schedule Modules; Secondary Education; Student Centered Curriculum

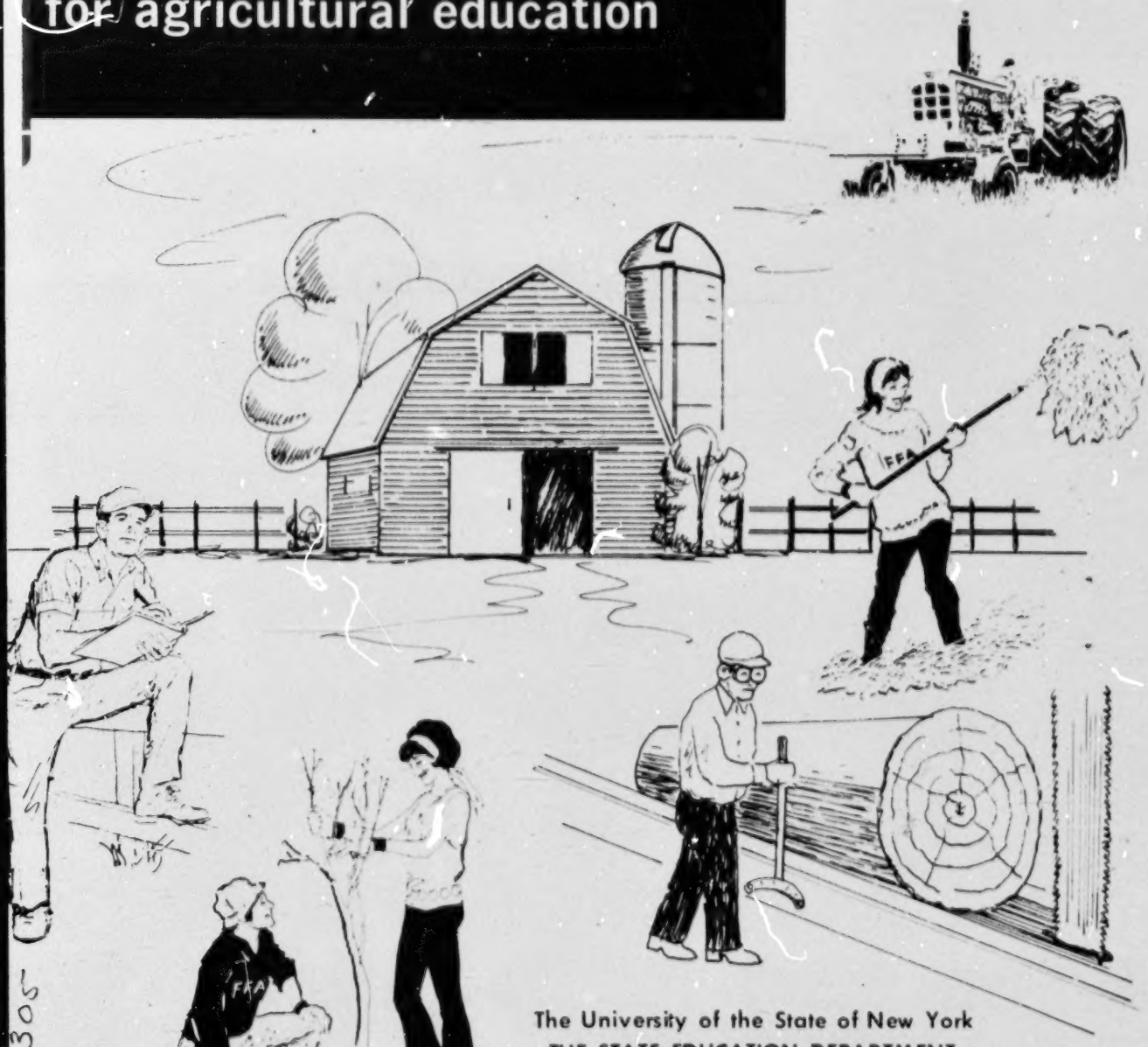
ABSTRACT

The modular curriculum for agricultural education was developed and refined by teachers and consultants to meet student needs for a more flexible type of curriculum in which the student's occupational goals would form the basis for program planning. The module--a unit of curriculum based on the development of entry level competencies--contains the following characteristics: 30 hours of instruction, student oriented, immediate goal attainment, free standing, body of related content, and continuous revision. The modular design program, for 16-18 year olds, is characterized by its greater subject matter choice, open door policy, seasonality, free flow of student movement, secondary or continuing education levels, individualization, and enrichment. A step-by-step procedure is offered to help establish such a program, including a list of personnel responsibilities and duties. Conducting the program involves preparation, module introduction, work experience programs, and youth leadership development activities. Different methods for program evaluation are proposed; forms for both a student and a teacher evaluation are included. The classification system for modules is a 16-page concluding section providing an explanation of the classification system, a description of the types of modules, and an index of over 200 modules prepared to date. (AG)

# modular design approach

## for agricultural education

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY




The University of the State of New York
THE STATE EDUCATION DEPARTMENT
Bureau of Secondary Curriculum Development
Albany, New York 1974

# MODULAR DESIGN APPROACH

## FOR AGRICULTURAL EDUCATION

1974

The University of the State of New York
THE STATE EDUCATION DEPARTMENT
Bureau of Secondary Curriculum Development
Albany, New York 12234

THE UNIVERSITY OF THE STATE OF NEW YORK

Regents of the University
(with years when terms expire)

| | | |
|---|---|---|
| 1984 | Joseph W. McGovern, A.B., J.D., L.H.D., LL.D., D.C.L., Litt.D., Chancellor | New York |
| 1981 | Theodore M. Black, A.B., Litt.D., LL.D., Pd.D., Vice Chancellor | Sands Point |
| 1978 | Alexander J. Allan, Jr., LL.D., Litt.D. | Troy |
| 1987 | Carl H. Pforzheimer, Jr., A.B., M.B.A., D.C.S., H.H.D. | Purchase |
| 1975 | Edward M. M. Warburg, B.S., L.H.D. | New York |
| 1980 | Joseph T. King, LL.B. | Shelter Island |
| 1981 | Joseph C. Indelicato, M.D. | Brooklyn |
| 1976 | Helen B. Power, A.B., Litt.D., L.H.D., LL.D. | Rochester |
| 1979 | Francis W. McGinley, B.S., J.D., LL.D. | Glens Falls |
| 1986 | Kenneth B. Clark, A.B., M.S., Ph.D., LL.D., L.H.D., D.Sc. | Hastings on Hudson |
| 1983 | Harold E. Newcomb, B.A. | Owego |
| 1988 | Willard A. Genrich, LL.B., L.H.D. | Buffalo |
| 1982 | Emlyn I. Griffith, A.B., J.D. | Rome |
| 1977 | Genevieve S. Klein, B.S., M.A. | Bayside |
| 1981 | William Jovanovich, A.B., LL.D., Litt.D., L.H.D. | Briarcliff Manor |

President of the University and Commissioner of Education
Ewald B. Nyquist

Executive Deputy Commissioner of Education
Gordon M. Ambach

Deputy Commissioner for Elementary, Secondary, and Continuing Education
Thomas D. Sheldon

Associate Commissioner for Instructional Services
William L. Bitner III

Assistant Commissioner for General Education and Curricular Services
Vivienne N. Anderson

Director, Division of Curriculum Development
Gordon E. Van Hooft

Chief, Bureau of Secondary Curriculum Development

Assistant Commissioner for Occupational and Continuing Education
Robert S. Seckendorf

Director, Division of Occupational Education Instruction
Robert H. Bielefeld

Chief, Bureau of Agricultural Education
Lee A. Traver

# FOREWORD

The curriculum design for Agricultural Education has been undergoing a major change. This is much more than a facelifting. It is a whole new way of individualizing the program offered to learners.

The concept of the flexibility of modular programming was initiated by Harold Noakes, former Chief, Bureau of Agricultural Education. The possibilities for implementation were developed through the cooperative efforts of the staffs of the Bureaus of Agricultural Education and Secondary Curriculum Development. Wallace Vog, former Associate, Agricultural Education was assigned a general coordinating role to work with Harold Noakes and Earl Hay, Supervisor of Vocational Curriculum, as a management development team for the project.

During the first summer, teams of teachers and consultants worked with the Bureau staff and management team to develop sample modules to be used in two prototype programs to begin with the opening of school in the fall. Professors William Drake, Frederick Tom, and Arthur Berkey, Division of Agricultural and Occupational Education, New York State College of Agriculture and Life Sciences at Cornell University, assisted in the planning and and development of the program and pointed out implications for the preparation of teachers to implement the new program design.

During the prototype year, several regional workshops of teachers and administrators were convened to explore the ramifications of the new design and to secure other pilot programs for the following year. E. Kenneth James, who was a member of the first writing team, became a member of the Bureau staff and later assumed the coordinating responsibilities during the third year of operation.

During three summers, and continuing during the school year, teams of agriculture teachers were preparing, testing, and revising modules for instructional purposes. This catalogue contains evidence of the development of over 200 separate modules, arranged in a coding system for easier identification and retrieval.

As these prototype programs continued through this developmental stage, specific modules were available only on request of those programs offering agriculture on a modular basis. The experience gained through the efforts of these programs has been compiled in this booklet to help other schools set up programs on a modular basis.

The many consultants, teachers, and staff members who were involved in the initial stages of this project are listed on the next page. Their efforts and contribution in making a better program for learners is acknowledged and greatly appreciated.

*G. Earl Hay*, Supervisor
Vocational Curriculum
Bureau of Secondary Curriculum Development

*Gordon E. Van Hooft*, Director
Division of Curriculum Development

## ACKNOWLEDGEMENTS

The persons listed below were employed by the Bureau of Secondary Curriculum Development to assist in designing, planning, and writing modules of instruction for the *Modular Design Approach for Agricultural Education*.

| | |
|---|---|
| Gary Barton | Randolph Central School |
| Raymond Briggs | Cobleskill Central School |
| Howard Brock | Schuyler, Chemung, Tioga BOCES, Elmira |
| Donald Burgett | Cornell University |
| James Capron | Finger Lakes Occupational School, Stanley |
| Maureen Caton | Oneida BOCES #1, Utica |
| Albert Celecki | Cayuga BOCES, Auburn |
| Alfred Chapin | New Berlin Central School |
| Robert Cicchetti | Nassau BOCES, Old Westbury |
| Charles Cook | Steuben BOCES, Painted Post |
| Thomas Cutter | North Franklin BOCES, Malone |
| Kenneth DeCerce | Schuyler, Chemung, Tioga BOCES, Elmira |
| Donald Demick | Cobleskill ATC |
| William Drake | Cornell University |
| Paul Emerling | Griffith Institute, Springville |
| Raymond Ernenwein | Kendall Central School |
| Richard Evans | Erie BOCES #2, East Aurora |
| John Faddegon | McKinley High School, Buffalo |
| Raymond Fox | Cornell University |
| Philip Fredenburg | Indian River Central School, Philadelphia |
| Leslie Gile | West Canada Valley Central School, Middleville |
| Kenneth Hance | Livingston BOCES, Mt. Morris |
| Ronald Hay | Chenango BOCES, Norwich |
| Bruce Hilton | Hilton Central School |
| Lyle Hotis | Gouverneur Central School |
| Donald House | Finger Lakes Occupational School, Stanley |
| Eugene Huff | Livingston BOCES, Mt. Morris |
| Arth[illegible] | Chenango BOCES, Norwich |
| Ken[illegible]es | Rensselaer BOCES |
| Edwa[illegible]rzejek | Cattaraugus BOCES, Ellicottville |
| Robert Johnson | Dutchess BOCES, Poughkeepsie |
| Harry Karpiak | Washington Academy, Salem |
| John Keller | Perry Central School |
| Richard Kent | Nassau BOCES, County Center |
| Harland Kester | Griffith Institute, Springville |
| Charles Krause | Cayuga BOCES, Auburn |
| Stuart Lamb | Cobleskill ATC |
| James Lewis | Cortland-Madison BOCES, Cortland |
| Arno Marks | Allegany BOCES, Belmont |
| Robert Miller | Nassau County Medical Center |
| Raymond Miller | Herkimer BOCES, Mohawk |
| Roy Milligan | Lewis County BOCES, Glenfield |
| Edward Nagel | Marathon Central School |
| Joseph Nagy | North Westchester Center, Yorktown Heights |
| Thomas Newton | Warren-Washington BOCES, Argyle |
| LeRoy Nichols | Lewis County BOCES, Glenfield |
| Charles Nutting | Oneida-Madison BOCES, Verona |
| Rand Oaster | Oneida-Madison BOCES, Verona |
| Kenneth Olcott | Cobleskill ATC |
| Elwood Olmstead | Finch-Pryne Lumber Company |
| Harold Peck | Finger Lakes Occupational School, Stanley |
| William Ransom | Greenville Central School |
| Richard Rawson | Chautauqua BOCES, Ashville |
| Robert Schmid | Nassau BOCES, Westbury |
| James Setser | Environment I Corporation, Schenectady |
| Paul Sicko | Schuylerville Central School |
| Vincent Smith | Alfred ATC |
| Carl Stevens | Cayuga BOCES, Auburn |
| Connor Stevens | Steuben BOCES, Hornell |
| Richard Strangeway, Jr. | Pioneer Central School, Yorkshire |
| Gordon Walsh | Cobleskill ATC |
| Robert Warner | Pioneer Central School, Yorkshire |
| Robert Watson | LaFayette-Tully Central School |
| George Wells | Schuyler-Chemung-Tioga BOCES, Elmira |
| Gordon White | Rockland BOCES, West Nyack |
| Ralph Whitehead | Morrisville ATC |

The staff of the Bureau of Agricultural Education who assisted with the Development and field testing of the modular approach were:

| | |
|---|---|
| Harold L. Noakes, Chief | William Wakefield |
| Wallace Vog, Coordinator | Lee A. Traver |
| E. Kenneth James | Frank Vaughn |

The curriculum development aspect of the project was coordinated by G. Earl Hay, Supervisor, Vocational Curriculum, Bureau of Secondary Curriculum Development.

Additional assistance in implementing the Modular Design Approach may be secured from the current staff of the Bureau of Agricultural Education:

| | |
|---|---|
| Lee A. Traver, Chief | E. Kenneth James |
| Kenneth DeCerce | Harry Karpiak |
| Roy Denniston | |

## MESSAGE TO EDUCATORS

The rapid expansion of agricultural education into non-farm related areas has resulted in many teachers looking for methods of meeting the individual needs and interests of students. One approach to providing instruction with the flexibility to meet individual students needs is the modular design.

Two companion publications have been prepared to assist school personnel in establishing a modular program in agriculture in their school. *The Modular Design Approach for Agricultural Education* contains:

- Description and characteristics of the Modular Design Program
- Establishing the Modular Design Program
- Index of module titles

These steps have all been tried on a pilot basis in both home schools and BOCES area occupational centers. Teachers find that the modular design has been successful in individualizing instruction for the students interested in agricultural courses. In initiating the program schools should select the elements of the design that best serve the needs of students in their program. It is hoped the experiences and knowledge gained in the pilot schools will be valuable in organizing your schools' modular program. The Bureau of Agriculture Education stands ready to help you in establishing your modular program.

*The Module Directory for Agricultural Education* contains descriptions of all the modules prepared to date. Divisions or units of content and time allocations for each module are provided as a base for program planning. Modules needed to implement the program may be requested from the Bureau of Agricultural Education, Room 1623, Twin Towers, 99 Washington Avenue, Albany, New York 12230.

*Lee A. Traver*, Chief
Bureau of Agricultural Education

*Robert H. Bielefeld*, Director
Division of Occupational Education Instruction

CONTENTS


FOREWORD . . . . . iii

ACKNOWLEDGEMENTS . . . . . iv

MESSAGE TO EDUCATORS . . . . . v

TABLES AND SAMPLE FORMS . . . . . viii

INTRODUCTION

History . . . . . 1
Need . . . . . 1

DESCRIPTION OF MODULAR DESIGN PROGRAM

The Design . . . . . 2

Definition of a Module . . . . . 2
Charactersitics of the Module . . . . . 2
Primary Characteristics of the Modular Design Program . . . . 4
Supplemental Characteristics of the Modular Design Program . . 7

PARTS OF A MODULE . . . . . 8

ESTABLISHING THE MODULAR DESIGN PROGRAM

Program Initiation . . . . . 10
Program Scheduling . . . . . 17
Personnel Responsibilities and Duties . . . . . 24

CONDUCTING THE MODULAR DESIGN PROGRAM

Preparation . . . . . 28
Module Introduction . . . . . 28
Work Experience . . . . . 29
Youth Leadership Development Activities . . . . . 29

EVALUATING THE MODULAR DESIGN PROGRAM

Student Accomplishment . . . . . 30
Module Evaluation . . . . . 30
Program Evaluation . . . . . 30

CLASSIFICATION SYSTEM FOR MODULES

Explanation of Classification System . . . . . 38

MODULE INDEX

Agricultural Production . . . . . 40
Agricultural Supplies and Services . . . . . 45
Agricultural Mechanics . . . . . 47
Agricultural Products . . . . . 49
Ornamental Horticulture . . . . . 50
Agricultural Resources . . . . . 52
Forestry . . . . . 54
Occupational Experience and Leadership Development . . . . . 55

## TABLES AND SAMPLE FORMS


Table 1 Occupational Program Card — Ornamental Horticulture . . . . . 14

Table 2 Occupational Program Card — Agricultural Mechanics . . . . . 15

Table 3 Occupational Goal Decision Making . . . . . 16

Table 4 Program Tally Card . . . . . 18

Table 5 Modules Offered . . . . . 19

Table 6 Instructor's Program . . . . . 20

Table 7 Instructor's Program . . . . . 21

Table 8 Occupational Program Card — Student Copy . . . . . 22

Sample Form 1 Student Evaluation Sheet . . . . . 31

Sample Form 2 Teacher Module Evaluation . . . . . 32

Sample Form 3 Student Module Evaluation . . . . . 33

Sample Form 4 Student Modular Program Evaluation . . . . . 34

Sample Form 5 Teacher Modular Program Evaluation . . . . . 36

# INTRODUCTION

## HISTORY

From its beginnings in the public schools of New York in the early 1900's, agricultural education has been a most successful venture. The success and importance of this part of the educational program was recognized early by the State Legislature by provision of special funds. These State funds and the Federal funds being spent for land grant colleges combined to provide teachers and schools where farmers could be educated. In 1917, the Federal Government joined the State in funding agricultural education by passage of the Smith-Hughes Act. The single objective of the funding was to provide training for students planning to live and work on farms. This single objective remained unchanged in this State until the mid-1940's when teachers took it upon themselves to provide training for students in agriculture, in areas other than farming. Teachers began teaching such off-farm topics as selling agricultural products, servicing farm equipment, floral design, and landscape maintenance. The Vocational Education Act passed by Congress in 1963 formally recognized these off-farm agricultural occupations.

From 1917 to the 1963 Act, New York was a leader in the Nation in the reorganizing and expanding of agricultural education to meet the needs of students. By 1964, five areas of agriculture were recognized and appropriate curriculum developed. These five were: farm production and management, agricultural business, agricultural mechanization, ornamental horticulture, and conservation. That same year the principal agriculture teacher training institution in New York, Cornell University, began training teachers in these more specialized areas.

## NEED

Our educational system has typically created a classroom of a single mold expecting every student to fit into this mold. The classroom has been teacher centered rather than student centered, and subject matter oriented rather than student goal oriented. Students, however, have begun to resist this type of instruction and have demanded a more flexible type of curriculum which gives each student the opportunity to follow a variety of potential employment opportunities even though they came through the same school curriculum.

It was in this setting that the modular curriculum for agricultural education was developed. In this program, the students and their occupational goals form the basis for program planning. The teacher knows that the content is relevant to the student because it is based on the collective needs of the students in the class as determined by individual student occupational goals. The teacher knows that the curriculum offered has been prepared by other teachers of agriculture who are offering similar programs throughout the State. Modules were reviewed by knowledgeable persons in industry and evaluated following their use.

It is hoped that as teachers use parts or all of this program they will continually add to the modules. Each addition made to the modules by a teacher will help his fellow teachers better utilize the total package. It is planned to keep this material current through this continuous revision process.

# DESCRIPTION OF MODULAR DESIGN PROGRAM

## THE DESIGN

In designing the program the agricultural occupational program (for 16 to 18 years olds), as well as programs in other curriculum areas, were investigated and reviewed. The resources of the United States Office of Education (USOE) and the past 70 years of experience in New York State agricultural education were utilized. The best ideas from the past were listed and put together with some of the modern educational techniques to develop a program which will more closely meet the needs of the student. These points have been organized in two areas — the characteristics of a module and the characteristics of the modular system.

This program is designed around the needs and desires of students who want to know what they are going to be doing, why they are doing it, and how they will know when they have done it.

### Definition of a Module

Webster defines a module as a "unit or standard of measurement." For the purposes of this program, a module is defined as a "unit of curriculum based on the development of entry level competencies." The total agriculture curriculum has been divided into units referred to as modules of equal length that will take approximately 30 hours of instructional time to achieve with the average group of students. The same package of material could be used with the handicapped learner who may need twice this time to attain the objectives. Modules could also form the basis of a continuing educational program where 30 hours of instruction is a common denominator.

### Characteristics of the Module

1. Thirty Hours of Instruction

The total instructional program is referred to as the *modular design*. The design is composed of individual parts called *modules*. Each module is organized to provide 30 hours of instruction since

- the normal occupational class instruction covers a minimum of 2 hours of each school day. This provides a 3-week length of time to concentrate on any particular module.
- the 3-week block of time in the 180-day school year allows the presentation of 12 modules, thus providing flexibility.
- student interest and accomplishment remains at a higher level with the shorter time allocation to a particular area of the total curriculum.

- it is recommended that at least 80 minutes of instruction per school day be used in the initiation and conduct of a modular system *categorized as occupational*. Also, using the 30 hour structure, any half school day (3-hour) program could offer a module every two weeks.

b Student Oriented

Each module is developed around knowledge, skills, and attitudes a student needs for entry level employment in the job cluster of his choice. A list of performance objectives is given to the student at the start of the module. These objectives tell the student what skills are to be achieved, how skills will be achieved, and the basis on which evaluation of skill development will be made. The major emphasis is placed on skill and attitude development.

c Immediate Goal Attainment

When the student knows what skills will be learned and under what conditions he or she must operate, it is not difficult to attain an immediate goal. As soon as the student demonstrates the level of skill development stated in the performance objective the instructor gives credit for this aspect of the total module. The student then moves on to the next objective.

d Free Standing

Each module is organized as a unit that may be taught by itself without several other modules as prerequisites. There are, of course, several instances where a student is advised that it would be appropriate for him to take one or two modules in a particular order.

A basic core of modules, containing introductory content, may be taught at the beginning of the program and thereby make more efficient use of subsequent specialized modules.

e Body of Related Content

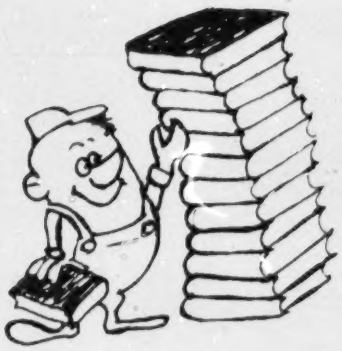
Each module is readily usable by teachers since it contains performance objectives, units of instruction, instructional content, teaching methods, student activities, evaluation procedures, and resource materials. This material aids the teacher who may not have a strong background in a particular instructional area. The scheduling of modules requires that the teacher have enough information available and feels confident enough to teach whichever modules are required to fullfill the student's program needs.

f Continuous Revision

The process of continuous revision is extremely important in assuring that each module is in its most usable form and contains current knowledge, skills, and attitudes required by industry. Every teacher who uses a module is asked to send in any suggestions he may have on the use of the module. Any additional information on resource material or content is then added to the module at the next revision. This new material will be available to all teachers.

## Primary Characteristics of the Modular Design Program

a Greater Subject Matter Choice



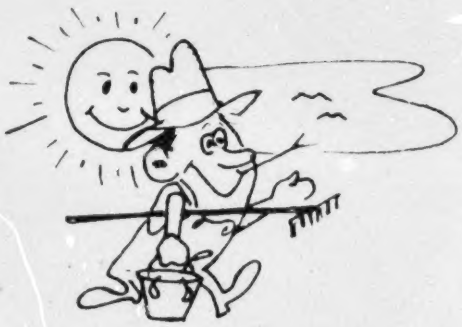
Each student is provided the opportunity to select his occupational goal. Students are no longer required to take a full program in such areas as Agricultural Mechanization or Agricultural Resources. The student has the option of choosing an occupational goal based on realistic job opportunities. This goal may involve a combination of several agricultural areas. A student can be programed into each area when the modules needed for his or her program are being taught. Students will then be able to develop the skills necessary to prepare them for their occupational goals. In the event that a student's occupational goal changes, there is flexibility for changing the individual's program format. This is accomplished by working with the parents, teacher, and guidance coordinator to successfully rearrange his schedule. It must be pointed out that every student may not take every module needed, but will, through this program, get a larger percentage of relevant education than in many current programs.

b Open Door

Any student who has an occupational goal which would require modules of agriculture would be eligible to participate in the program. For example, a student interested in engineering may benefit by taking the three modules in surveying listed under the area of Agricultural Resources. He could be programed into the classes when these modules were scheduled and then continue with his regular college preparatory program. The student could receive recognition for the modules toward graduation. In some cases, college students have returned to take modules which they thought were of value to them in preparing for their occupational goals.

c Seasonality

The field of agriculture is unlike most other occupational fields. It is directly connected with the outdoor environment. In keeping with the occupational philosophy of *"hands-on"* activity and *"real life experiences"* it is desirable to offer modules of instruction during the time when the conditions are appropriate to teach certain modules. For example, the proper time to offer a module on hay harvesting or grain harvesting is when these crops are being harvested. If this means offering modular instruction during times other than the regular school year, it is so recommended.



d Free Flow

After a student has selected an occupational goal, with an appropriate list of modules to reach that goal, he needs to be able to move to the curriculum area where these modules are being offered. For example, the student majoring in the area of Ornamental Horticulture may want to spend a short period of time in the areas of Agricultural Production, Agricultural Mechanics, or Agricultural Resources to take modules offered in these areas that provide the skills necessary for his goal choice. Many students will still spend most of their time in a *major* area of the curriculum but this gives them the option to specialize if they feel they are ready to do so.

The effectiveness of the modular program can only be enhanced by the development of Occupational Orientation and Exploration programs in grades 7 through 10, that allow the student to better understand the aspects of occupations that interest him. After participating in such programs he will then be in a stronger position to make the occupational choice appropriate to his interest and abilities.

e Secondary or Continuing Education Levels

The modular design is prepared for students 16 years old or older. Although some modules are applicable to the orientation and exploration levels, the main thrust of the design is to provide modules for occupational skill development. A second application of the program relates to continuing education. The modules' structure and time frame, as well as level of activities, make them most effective for continuing education programs.

f Individualization

The modular curriculum is well suited to the individualization of instruction. With over 200 modules in the agriculture area it is easy to fit these building blocks together in the arrangement that meets the needs of the student. In some occupations a group of nine or ten modules may be sufficient for entry into an occupation, while in other occupatiosn 24 or more modules may be needed. With this knowledge at hand, and working with the instructor and guidance coordinator, the student can select the proper job title. Individual learning may also take place during cooperative work experiences which may be a part of the modular program.

g Enrichment

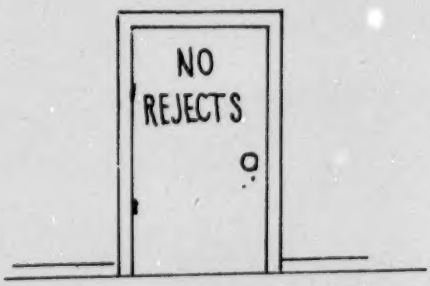
The number of modules that most students will take in a 2-year program will be 24. A module will be covered in approximately 3 weeks of the school year. In some of the Area Occupational Centers, the students are actively engaged in programs that range up to 3 hours. In these cases it will be possible to teach one or two extra modules per year. These could be modules that are of a particular interest to the individual student. Some home schools may allow students to move into the agriculture department to take one or two modules that they are interested in to enrich their high school curriculum.

## Supplemental Characteristics of the Modular Design Program

a Rapid Recycling

In the modular program a student is evaluated on ability to meet a level of competence established in each objective. When the student has demonstrated the performance level stated in the objective, he moves on to the next objective. If a student does not reach a stated level on one or several of the objectives, he may, at some prearranged time in the future, go back and work on those objectives which are needed. Upon completion of objectives, he receives credit for them just as if he had reached the desired level of competency when the module was originally being taught. The student need not be penalized for his inability to complete the objectives within a specified time, nor does the student have to repeat the entire module.

b No Reject




Students enrolled in the modular design program will undoubtedly possess diverse ability levels. A student may encounter performance objectives which he is unable to meet. In this event, the student and teacher cooperatively determine the objectives to be met. The student receives full credit for the module upon completion of the determined objectives. The evaluation of the student's performance level can be handled in several ways. Alternatives are expressed in the evaluation section.

c Articulation

The modular curriculum program is basically designed to provide for entry level placement upon graduation from high school. Concern must also be given for students who could be *turned on* by the occupational program and want to continue their schooling at a higher level. A major concern developed regarding students having to repeat courses at the technical level that were basically the same as those in high school. Instructors at the Agricultural and Technical Colleges and Cornell University were involved with the initial phases of modular development to help bridge the gap between the modular program and programs at the postsecondary level. These instructors were used on the writing teams and as consultants to the total program. It is hoped that this type of involvement will facilitate articulation between the high school and postsecondary programs.

## PARTS OF A MODULE

Each module contains the following basic parts: Description, Units of Instruction, Objectives, Content, Teaching Method, Student Application Activities, Evaluation Procedures, and Resource Materials.

### 1 Description

A short paragraph gives the reader a thumbnail description of the knowledge, skills, and attitudes that a student will gain if this module is part of his occupational program goal.

### 2 Units of Instruction

Presents the units in outline form that will be covered in the module and the order in which they will be covered. Units are the major subdivisions of a module's content.

### 3 Objectives

Each module will contain performance objectives. These are statements of *what a student will be able to do* upon the completion of the module (30 hours of instruction) which the student was not able to do prior to taking the module. The objectives state *where the student will be doing the activity* (field, laboratory or classroom), *the conditions under which the student will operate* (for example, a spade to dig a tree for resale from a nursery), and *the level of performance the student is expected to achieve* (for example, how long will it take him to dig and burlap an 18 inch high shrub). At the beginning of each module, the teacher should give each student a copy of the objectives to be attained throughout the module.

### 4 Content

In the modular design the modules taught are those that are needed by the greatest number of students. An adequate content section for each module reinforces the teacher's knowledge and competency in the area of instruction. This is important to assist the teacher in preparing to teach those modules which are based on the students' needs.

### 5 Teaching Methods

The teachers are given some suggested techniques of teaching the material found under the content area. Various audiovisual aids, field trips, and group instruction ideas which will help lend variety to the program will be listed. It is important to provide a student activity based program.

## 6 Student Application Activity

In an occupational program the main emphasis is on *the doing* rather than the watching. The modules are built around this *doing* principle and the student activity section lists a variety of activities that the student may be engaged in to facilitate his achieving the performance objectives. The suggested activities help the teacher plan appropriate activities for the day-to-day operation of the class.

## 7 Evaluation Procedures

A number of ways of determining when a student has reached the desired level of achievement (performance objective) are described in this section. The methods described will range from written tests to *hands-on* skill testing. The emphasis in modular evaluation should be a continuous activity throughout the module rather than on a single test given at the end. As a student is able to reach the level of skill development stated for an objective, evaluation for that objective takes place and achieving the next objective can begin. When all agreed upon performance objectives have been accomplished the student's work for that module is complete. Reinforcement is achieved through further class work and work experience programs.

## 8 Resource Materials

This area is divided into four subsections for the purpose of easier retrieval of information related to the subject of the module. These sections are: Books, Bulletins, Periodicals, and Audiovisuals.

Each section lists these materials found to be helpful for successful teaching of the module. These materials will aid the teacher preparing to teach the module, especially if he wants to identify more in-depth information about the content covered in the module. In many cases there will also be noted a source where materials may be purchased or rented.

Teachers using good reference materials not listed are requested to send such information to the Bureau of Agricultural Education for consideration in the next revision process. The Instructional Materials Service (IMS) at Cornell University is compiling packets of materials for modules as a priority need is indicated.

## ESTABLISHING THE MODULAR DESIGN PROGRAM

### PROGRAM INITIATION

Schools offering or initiating agricultural education are encouraged to use the curricular format of the modular design. A step-by-step procedure is suggested that will maximize the benefits of offering this type of curriculum. Modular design necessitates the involvement of the major component groups effecting education in a school system.

A suggested sequence of initiation activities follows:

1 Read the introductory material on the modular design. Contact the Bureau of Agricultural Education if clarification or additional explanation is needed.

2 Orientation Meeting

After agreeing upon the modular design and its implications, set up a meeting to initiate the program.

a Personnel to include:

. All teachers of agriculture

All teachers must be included since they will conduct the program. Complete teacher participation, cooperation, and expertise are essential from the beginning.

. Other teachers who might be involved

The ramifications and intent of the modular design makes the inclusion and cooperation of teachers in other program areas very beneficial. The teacher of distributive education, chemistry, or speech could be effective in using modules.

. Guidance Personnel

Since the modular design is a student centered program and guidance personnel actively assist students in their program plans, inclusion of this group in the design is essential. The guidance personnel will be involved in initial school and student contacts, in program setup and presentation, in program scheduling, and in reporting student progress.

. Administration

The chief school officer and other administrative personnel responsible for administering secondary programs must be included in planning for the modular design.

Initial program implementation may require immediate administrative decisions which would be based on an understanding of the sequential events in program development.

. Members of the agriculture advisory committee

A total design involves the community. The advisory committee has a definite part in the design. This role, in addition to that assumed in the traditional program, would involve the committee in (a) identifying occupations in the service area of the school system for which modules in agriculture would assist in preparing prospective employees, (b) identifying work experience stations, and (c) assisting the teacher of agriculture in selecting appropriate modules for occupational titles selected.

. Student representatives

The design is student oriented. Therefore, students should be involved in the structure. Their ability to express fellow students' opinions could be beneficial to the ready acceptance of the programs. Students also would be logical reporters of the program to fellow students.

. Parents of prospective students

It is vital that parents be kept informed of how this program will affect their child. Parental involvement greatly enhances support of the program. In the pilot programs parents felt the indication of objectives accomplished were better progress reports than a letter or numerical grade.

Parents should also know if modules of instruction are going to be built around a work experience program. They should be aware that the cooperative work experience coordinator or teacher will be responsible for supervising their son's or daughter's cooperative work experience program.

b Meeting agenda should include:

. Purpose of the session

- Explain modular design
- Set up process for initiation, conduct, and evaluation of the program.

. Discussion of modular design

- Concept
- Examples
- Application

. What the group is attempting to accomplish

- Review and adopt the modular design program
- Organize the group for work assignments
- Establish objectives and time table for program development
- Determine specific activities to be carried out by each member of the group
- Establish due dates
- Establish role and responsibilities of each school staff member (pages 24 to 27 review suggested responsibilities list)

c Resource Materials

Make arrangements to have sufficient copies of the following materials available at the meeting

. Introduction

. Description of Modular Design Program

. Establishing the Modular Design Program

. Conducting the Modular Design Program

. Evaluating the Modular Design Program

. Modular Design Materials

3 Agriculture Advisory Committee Meeting

The teacher(s) of agriculture should meet with the total advisory committee and review the modular design, including the responsibilities of the advisory committee. The design should be understood by the members of the committee. This meeting should explain the committee's responsibilities, such as:

a Identification of occupations/jobs in the service area of the school system

b Assigning modules to occupation/job titles. List the modules in descending order of importance.

c Identification of possible work experience stations and employers

The success of this meeting will be greatly enhanced by the dissemination of a meeting agenda and modular design materials prior to the date of the meeting. Committee members should study all parts. The Descriptions of Individual Modules is particularly important.

4 Compilation of Information

The information developed by the agriculture advisory committee is organized on occupational program cards (see Table 1 and 2 pages 14 and 15) by the teacher and/or guidance coordinator. A program card is written for each occupation or job in the geographic area. The card lists the modules which would provide instruction leading to employment in that particular job cluster. Modules are listed in descending order of importance for that job cluster.

There will be jobs identified that do not require 24 modules of instruction. A student may use work experience as a capstone experience or take additional modules that would prepare him in a related job area.

5 Student Orientation Meeting

The teacher(s) of agriculture compiles advisory committee meeting information, then arranges a meeting of all prospective students with the assigned administrative and guidance personnel. (Prospective students are all students 16 years of age or older in the school system.) Depending upon the number and location of prospective students, more than one meeting may be necessary. The objectives of this first meeting are to:

a Define and illustrate agricultural education as it will be offered in the school system

b Review the modular design as it will be used

c Describe several examples of occupation/job titles and modules that would be available

d Answer students' questions

e Record names of students wishing to enroll

Schools conducting pilot programs found that holding this meeting by June with all tenth graders or 15-year-olds was most effective in starting the program the following September.

6 The teacher(s) of agriculture and/or the guidance coordinator meet with students desiring to enroll. This second meeting with those who have indicated a desire to enroll may be in two parts if more than one teacher is involved.

The first session would be a general one in which students would be involved in selecting the major agricultural group they are interested in. Major agricultural groups are agricultural production, agricultural supplies and services, agricultural mechanics, agricultural products, ornamental horticulture, agricultural resources, and forestry.

TABLE 1

OCCUPATIONAL PROGRAM CARD

Name

| Job Title Selection | DOT NO. |
|---|---|
| 1. Grounds Keeper | |
| 2. Grounds Maintenance Employee | 406.887 |
| 3. Park Worker | |
| 4. Arborist | |
| 5. Turf Specialist - 6. Greens Sup't. | 407.137 |

Ornamental Horticulture

| CODE # | TITLE | PERIOD | TEACHER |
|---|---|---|---|
| .0599 - 06 | Operat. &Maint. Eqt. | | |
| .0599 - 02 | Prepare &Maint.Soils | | |
| .0599 - 01 | Cont. Insects.Disease | | |
| .0506 - 01 | Sod Production | | |
| .0504 - 06 | Maintg.Woody Shrubs | | |
| .0501 - 01 | Climbg.,Limbg.,Felling. | | |
| .0504 - 05 | Implementing Plans | | |
| .0504 - 02 | Const.Landscp.Ftrs. | | |
| .0301 - 05 | Tractor Service | | |
| .0504 - 07 | Ident.& Use of Herb. | | |
| .0501 - 02 | Pruning Ornamentals | | |
| .0506 - 02 | Lawn Construction | | |
| .0301 - 03 | Small Engine Serv. | | |
| .0603 - 01 | Soil Science | | |
| .0603 - 03 | Soil Erosion Control | | |
| .0603 - 02 | Soil & Water Mgt. | | |
| .0599 - 09 | Prep.Nurs.Stock,Sale | | |
| .0599 - 03 | Using Woody Plants | | |
| .0599 - 04 | Dev.Hort.Business | | |
| .0599 - 05 | Estim.Prods.&Serv. | | |
| .0599 - 07 | Scheduling Crop Prod. | | |
| .0504 - 01 | Landscape Design | | |
| .0504 - 04 | Indr.Foliage Shrubs | | |
| .0504 - 03 | Indoor Landscape | | |
| | | | |
| | | | |
| | | | |

Home School

TABLE 2

OCCUPATIONAL PROGRAM CARD

Job Title Selection — DOT NO.

1. Farm Equipment Serviceman — 624.381
2.
3.
4.

Agricultural Mechanics

Name

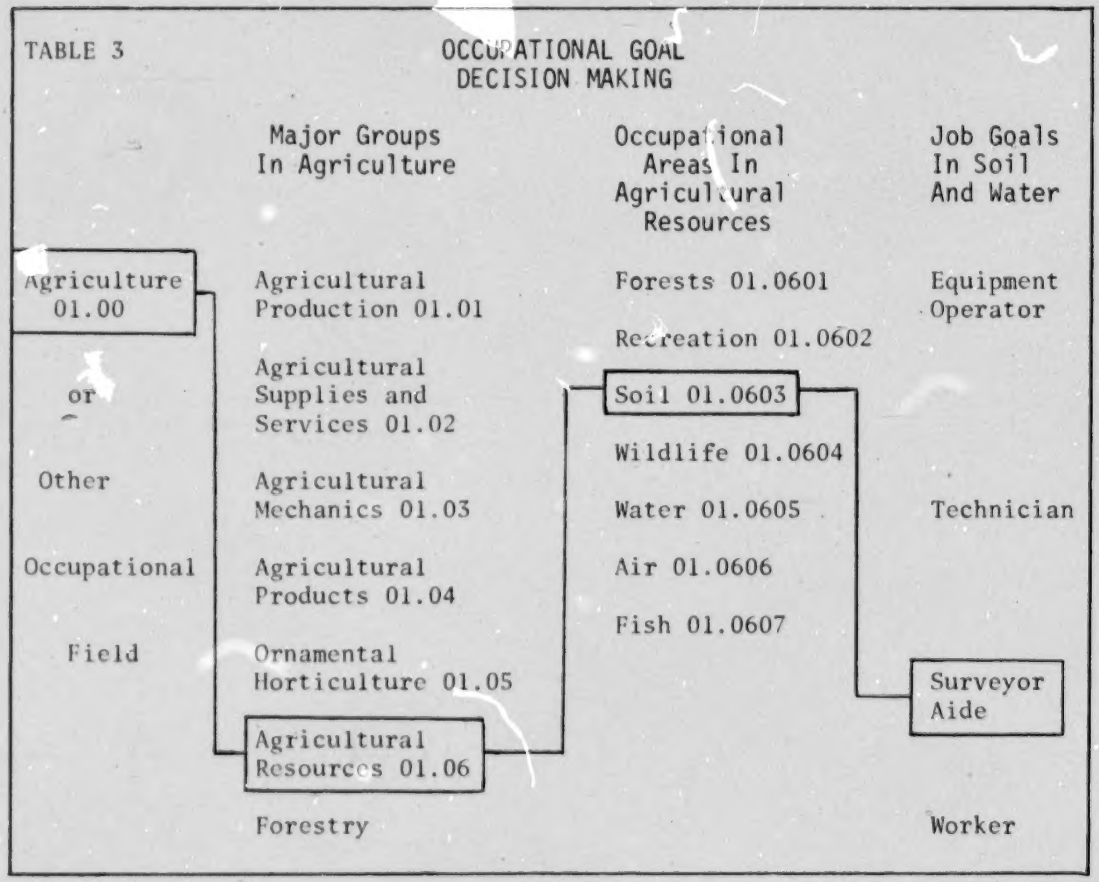
Home School

| CODE # | TITLE | PERIOD | TEACHER |
|---|---|---|---|
| .0305 - 01 | Shop Mgt & Equip Util | | |
| .0301 - 05 | Tractor Service | | |
| .0301 - 06 | Trac.Engine Tune-up | | |
| .0301 - 10 | Tractor Ignition Sys. | | |
| .0301 - 14 | Op.Mach & Equip. | | |
| .0301 - 08 | Trac.Fuel Sys.(Gas) | | |
| .0301 - 09 | Trac.Fuel Sys.(Desl). | | |
| .0301 - 03 | Small Engine Service | | |
| .0301 - 17 | Hydraulic Systems | | |
| .0305 - 02 | Basic Welding | | |
| .0301 - 20 | Hay & Forage Equip. | | |
| .0301 - 18 | Tillage Equipment | | |
| .0301 - 13 | Ag Power Train | | |
| .0301 - 19 | Plant-Spray-Fert.Eqt. | | |
| .9901 - 02 | Work Experience | | |
| .0301 - 07 | Trac.Eng.Top Overhaul | | |
| .0301 - 15 | Ag Machinery Setup | | |
| .9901 - 01 | Set Up Work Exprnce. | | |
| .0299 - 03 | Oral/Writn.Communs. | | |
| .0206 - 01 | Record Keeping I | | |
| .0301 - 21 | Grain Harvest.Eqpt. | | |
| .0305 - 04 | Paintg.Tracs.& Eqpt. | | |
| .0301 - 26 | Milking Equipment | | |
| .0299 - 02 | Computation in Ag | | |
| .0299 - 01 | Personal Finances | | |
| .9902 - 03 | FFA Organizations | | |
| | | | |
| | | | |
| | | | |

A followup session would involve each teacher of agriculture working with the students who selected the major group(s) the teacher is responsible for teaching. The student selects an occupational goal. These goals refer to the student's intention to gain entry level employment in a job identified by the advisory committee. The statement of a goal is a result of a series of decisions made by the student. Table 3 shows a route a student may follow in his occupational selection process.

TABLE 3

OCCUPATIONAL GOAL DECISION MAKING




Other goals related to agriculture, but not specifically preparation for employment, would be considered separately. Following a thorough discussion, the student indicates his name and school on the appropriate program card.

## PROGRAM SCHEDULING

After students have turned in the program cards, a recording procedure must be initiated. The procedure should involve the guidance personnel and teacher(s) of agriculture. This team should:

1 Compile the number of requests for each module from the occupational program cards. See samples on Tables 4 and 5, pages 18 and 19.

2 Rank the modules requested from the most to the least needed. Separate ranking should be made in each major group, that is, agricultural production, agricultural supplies and services, agricultural mechanics, agricultural products, ornamental horticulture, agricultural resources, and forestry. See Table 5.

3 Using the modules most requested in each group, set up a teaching calendar for each teacher to be involved in the modular design (Tables 6 and 7, pages 20 and 21).

The modules to be offered should reflect not only those most requested, but also:

a physical facilities available

b equipment and supplies available

c time of year most desirable to offer the module

d adaptability of modules to an individualized program

e manageable class size

The student will take 12 modules of instruction in a year. However, a teacher may teach more than 12 modules per year. The above factors, in addition to the need to meet individual student's needs, may result in two or three modules being taught simultaneously by one teacher. For example, in the Agricultural Resources area the teacher may be conducting modules in Land Measurement, Bulldozer Service and Operation, and Backhoe and Loader Service and Operation at one time.

The teaching calendar may show an instructor teaching a particular module twice due to a large number of students needing instruction. (See 1 above.)

A single teacher teaching in a local school with 45 minute periods could provide a module every 4 weeks (30 hours of instruction) with double period scheduling. This allows 10 modules per year to be taught if all 40 of the school weeks were utilized. In three double periods per day, 30 modules could be offered by the teacher in a school year.

After these 10 modules for each double class session are programed into the calendar the teacher should consider ways of teaching modules that were requested by only a few students. Individualized teaching packets,

TABLE 4

PROGRAM CARD TALLY

MODULES REQUESTED

| | Agricultural Production | | | | | Agricultural Supplies and Services | | | | | Agricultural Mechanics | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Module # | 1 | 2 | 3 | 4 | 59 | 1 | 2 | 3 | 4 | 23 | 1 | 2 | 3 | 4 | 39 | |
| Student 1-Jim | - | X | - | X | X | - | - | X | X | - | - | - | - | - | - | |
| 2-Bob | - | - | X | X | X | - | X | X | - | - | - | - | X | - | X | |
| 3-Paul | - | - | - | - | - | - | - | - | - | - | - | - | X | X | - | |
| 4-Peter | X | - | - | X | - | X | - | X | - | - | - | X | - | - | - | |
| 5-Denny | - | - | - | - | - | X | - | - | - | X | X | X | X | - | X | |
| 6-Bill | - | X | - | - | - | - | - | - | - | - | - | - | - | - | X | |
| 20-Ralph | X | X | X | - | X | - | - | - | - | X | X | X | X | - | - | |
| TOTALS | 12 | 9 | 10 | 27 | 24 | 18 | 5 | 11 | 3 | 6 | 7 | 40 | 21 | 4 | 74 | |

| | Ornamental Horticulture | | | | | Agricultural Resources | | | | | Forestry | | | | | Other Agriculture | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Module # | 1 | 2 | 3 | 4 | 28 | 1 | 2 | 3 | 4 | 27 | 1 | 2 | 3 | 4 | 7 | 1 | 2 | 3 | 4 | 8 |
| Student 1-Jim | - | - | - | - | - | - | X | - | X | - | - | - | - | - | - | - | - | X | - | - |
| 2-Bob | - | X | - | X | - | - | X | - | X | - | - | - | - | - | - | - | - | X | - | - |
| 3-Paul | - | - | - | - | - | X | X | - | X | X | X | X | X | - | - | - | - | - | - | - |
| 4-Peter | - | - | X | X | X | X | - | - | - | - | - | - | - | - | - | X | - | - | - | - |
| 5-Denny | - | - | - | - | - | X | - | - | - | X | - | - | - | - | - | - | X | - | X | - |
| 6-Bill | - | X | - | - | - | - | - | - | X | X | X | X | X | - | X | - | - | - | - | X |
| 20-Ralph | - | - | - | - | - | - | - | - | - | X | - | - | - | - | - | - | - | X | X | - |
| TOTALS | 3 | 9 | 7 | 5 | 21 | 6 | 8 | 2 | 9 | 45 | 12 | 15 | 8 | 6 | 28 | 4 | 5 | 8 | 9 | 33 |

TABLE 5

MODULES OFFERED

| Area and Module | No. in Each Module | Priority Rating | | Modules that Will be Offered |
|---|---|---|---|---|
| | | Total | Area | |
| Conservation | | | | |
| Module 1 | 8 | 11 | 2 | x |
| 2 | 7 | 12 | 3 | |
| 3 | 4 | 15 | 4 | |
| 32 | 15 | 5 | 1 | x |
| Ag Mechanics | | | | |
| Module 1 | 16 | 4 | 3 | x |
| 2 | 4 | 15 | 4 | |
| 3 | 18 | 2 | 2 | x |
| 32 | 21 | 1 | 1 | x |
| Ag Business | | | | |
| Module 1 | 2 | 17 | 3 | |
| 2 | 10 | 9 | 1 | x |
| 3 | 1 | 18 | 4 | |
| 30 | 6 | 13 | 2 | |
| Ornamental Hort. | | | | |
| Module 1 | 11 | 8 | 3 | x |
| 2 | 14 | 6 | 1 | x |
| 3 | 5 | 14 | 4 | |
| 23 | 9 | 10 | 2 | x |
| Agricultural Production | | | | |
| Module 1 | 12 | 7 | 3 | x |
| 2 | 3 | 16 | 4 | |
| 4 | 15 | 5 | 2 | x |
| 28 | 17 | 3 | 1 | x |

TABLE 6

INSTRUCTOR'S PROGRAM

NAME John Bailer SCHOOL YEAR 1974-75

| PERIOD | MODULE OFFERED | LOCATION | TIME |
|---|---|---|---|
| 1. 9-14 to 10-2 | C-20: Erosion Control | AG Facilities | 9:15-11:15 a.m. |
| 2. 10-5 to 10-23 | C-1: Operating Timber Harvesting Equipment | Ag Land Lab | " |
| 3. 10-26 to 11-13 | C-30: Leadership Development | Ag Classroom | " |
| 4. 11-16 to 12-11 | C-10: Wetland Game Management | Ag Facilities | " |
| 5. 12-14 to 1-15 | AM-33: Ag Shop Procedures | Ag Shop | " |
| 6. 1-18 to 2-5 | AM-10: Basic Tractor Servicing | Ag Shop | " |
| 7. 2-8 to 2-26 | C-33: Work Experience Programs | Ag Classroom | " |
| 8. 3-1 to 3-19 | C-3: Conservation Law | Ag Facilities | " |
| 9. 3-22 to 4-16 | AM-3: Small Gas Engine Service and Repair | Ag Shop | " |
| 10. 4-19 to 5-7 | C-4: Surveying | Ag Land Lab | " |
| 11. 5-10 to 5-28 | C-14: Bulldozer Service and Operation | Ag Land Lab | " |
| 12. 5-31 to 6-18 | C-13: Operation and Maintenance of Campgrounds | Ag Facilities | " |
| 13. 7-5 to 7-16 | C-21: Operation and Maintenance of Summer Recreation Areas | Ag Facilities | 9:00 a.m. to noon |
| 14. 7-19 to 7-30 | C-17: Forest Fire Control | Ag Facilities | 9:00 a.m. to noon |

TABLE 7

INSTRUCTOR'S PROGRAM

NAME Bill Smith SCHOOL YEAR 1974-75

| PERIOD | MODULE OFFERED | LOCATION | TIME |
|---|---|---|---|
| 1. 9-14 to 10-2 | OH-3: Preparing and Maintaining OH Soils | OH Facilities | 9:15-11:15 a.m. |
| 2. 10-5 to 10-23 | OH-20: Scheduling OH Crop Production | OH Classroom | " |
| 3. 10-26 to 11-3 | OH-30: Leadership Development | OH Classroom | " |
| 4. 11-16 to 12-11 | OH-22: Producing Holiday Decorations | OH Facilities | " |
| 5. 12-14 to 1-15 | OH-14: Estimating and Pricing OH Products and Services | OH Classroom | " |
| 6. 1-18 to 2-5 | OH-16: Preparing Products for Sale | OH Facilities | " |
| 7. 2-8 to 2-26 | OH-4: Floral Design | OH Facilities | " |
| 8. 3-1 to 3-19 | OH-8: Growing Greenhouse Crops | Greenhouse | " |
| 9. 3-22 to 4-16 | OH-11: Identification and Use of Foliage Plants | OH Facilities | " |
| 10. 4-19 to 5-7 | OH-10: Funeral Tributes | OH Facilities | " |
| 11. 5-10 to 5-28 | OH-4: Floral Design | OH Facilities | " |
| 12. 5-31 to 6-18 | OH-6: Indoor Landscaping | Greenhouse | " |
| 13. 7-5 to 7-16 | OH-2: Controlling Insects and Diseases and Fertilization | Greenhouse | " |
| 14. 7-14 to 7-30 | OH-18: Advanced Floral Design | Greenhouse | " |

TABLE 8

OCCUPATIONAL PROGRAM CARD - Student Copy

Name

Job Title Selection — DOT NO.

1. Grounds Keeper
2. Grounds Maintenance Employee — 406.887
3. Park Worker
4. Arborist
5. Turf Specialist - 6. Greens Sup't. — 407.137

Ornamental Horticulture

Home School

| CODE # | TITLE | PERIOD | TEACHER |
|---|---|---|---|
| .0599 - 06 | Operat.&Maint. Eqt. | 3 | Davis |
| .0599 - 02 | Prepare & Maint.Soils | 1 | Cole |
| .0599 - 01 | Cont. Insects.Disease | 12 | Cole |
| .0506 - 01 | Sod Production | | |
| .0504 - 06 | Maintg.Woody Shrubs | 10 | Allen |
| .0501 - 01 | Climbg., Limbg., Felling. | 5 | Bent |
| .0504 - 05 | Implementing Plans | 9 | Allen |
| .0504 - 02 | Const.Landscp.Ftrs. | 4 | Allen |
| .0301 - 05 | Tractor Service | 6 | Davis |
| .0504 - 07 | Ident.& Use of Herb. | 11 | Allen |
| .0501 - 02 | Pruning Ornamentals | | Id.Study |
| .0506 - 02 | Lawn Construction | | |
| .0301 - 03 | Small Engine Serv. | 7 | Davis |
| .0603 - 01 | Soil Science | | |
| .0603 - 03 | Soil Erosion Control | | |
| .0603 - 02 | Soil & Water Mgt. | | |
| .0599 - 09 | Prep.Nurs.Stock,Sale | | |
| .0599 - 03 | Using Woody Plants | | |
| .0599 - 04 | Dev.Hort.Business | | |
| .0599 - 05 | Estim.Prods.& Serv. | | |
| .0599 - 07 | Scheduling Crop Prod. | 2 | Allen |
| .0504 - 01 | Landscape Design | 8 | Allen |
| .0504 - 04 | Indr.Foliage Shrubs | | |
| .0504 - 03 | Indoor Landscape | | |
| | | | |
| | | | |
| | | | |

using the modules as the focal point, could be developed. The students could use overheads, tapes, and handouts prepared in advance by the teacher, along with the module outline. The teacher would be available for help when the student ran into difficulty during the module.

The possibility of utilizing the community resources should not be overlooked. Work-study modules may be arranged to meet the needs of the students in specialized areas of instruction where the teacher cannot work this content into his schedule.

4 Having prepared the teaching calendar(s), the teacher(s) of agriculture and guidance personnel should also return program cards to each student indicating which modules he will be taking in agriculture and when these modules will be offered (See Table 8 page 22) The program card serves as a schedule of modules the student will take during the whole year. The schedule should be adhered to for the entire school year. Changes in modules scheduled should only occur following consultation with the teacher(s) and guidance coordinator. Any modules based on independent study or cooperative work experiences should be indicated.

## PERSONNEL RESPONSIBILITIES AND DUTIES

### Administrator

1 Agree to give teachers the support necessary for the smooth implementation of the program.

2 Agree to allow teachers an opportunity to meet with students interested in coming into the agricultural program (usually 10th graders) for the purpose of orientation and occupational goal selection. This could be in June or during the summer to have the program ready for September.

3 Be prepared to have equipment repaired immediately so that program delay is kept to a minimum.

4 Be knowledgeable enough about the modular design concept to be able to answer questions that students, other teachers, or parents may ask about the program.

### Agriculture Teacher

1 Help in the selection of persons to serve on the advisory committee for his teaching area.

2 Meet with this advisory committee to:

a introduce the modular design program

b identify the occupational titles for their area

c select the modules to be taught for each occupational title identified above

d identify work experience stations in their area

e evaluate the program after it has been in operation for a part of the school year

3 Make up a card listing the occupational title and modules appropriate for that title, formulate an "occupational program card." (example, Table 1, page 14).

4 Meet with students to:

a orient them to the modular design program

b help the students in the selection of an occupational goal

c select one of these occupational goals for their program (Write the students name on the occupational program card that identifies his or her occupational goal.)

5 Tabulate these student program cards to determine how many students need each module. (Table 4, page 18)

6 Set up teaching program in the subject matter area *based on the modules that are in greatest demand in the curriculum area.* (Tables 5, 6, and 7, pages 19 through 21).

7 Set up any individualized programs where only one or two students have selected a module.

8 Set up work experience stations for students.

9 Develop the behavioral objective lists into a handout which can be given to each student the first day of the module. This same list becomes the evaluative tool for that module. A copy of this list should be kept by the teacher and one copy sent home as the reporting system. It is recommended that the copy sent home be the foundation of a dossier to be presented to a potential employer by the student. This will give the employer a clearer picture of the student's skills than the standard report card.

10 Secure through the Instructional Materials Center at Cornell University or other sources the resources listed in each module to be taught.

11 Check modules to make sure that the equipment or laboratory areas are available to teach each module scheduled in the program.

12 Inform the Bureau of Agricultural Education of the modules needed for the program.

13 Give each student a copy of the list of modules he will be taking.

Guidance Counselor

1 Be completely aware of the modular design concept, from its inception in the school, to be capable of answering student questions which might come up.

2 Help wherever possible in the development of the "occupational program cards".

3 Coordinate the student orientation sessions (usually 10th graders) where the modular design is explained to them and where students have the opportunity to make occupational goal selections.

4 Work with students who have decided that they made the wrong choice of an occupational goal and explore other possible alternatives.

5 Work with Career Education Coordinators to help students develop a clearer picture of the jobs available to them. This will greatly assist students in making wise decisions when they come into the modular occupational selection meeting during the 10th grade.

Placement and Follow-Up Coordinator

1 Be completely aware of the modular design concept, right from its inception in the school, to be capable of answering student questions that may arise concerning the program.

2 Work closely with the teacher during his advisory committee meetings where the list of occupational titles for the school area is being developed.

3 Assist the advisory committee and teacher in the selection of modules for each occupational title to make up the program cards.

4 Advise the teacher of any additional job placement opportunities he may discover during the year. For each job added to the list a program card with the appropriate list of modules should be developed.

5 Alert the teacher to all work experience opportunities both for long and short term bases, that are available.

6 During follow-up work with employers a review of the program card for that occupational title would be in order. This would bring to light any glaring deficiencies in the selection of modules for that occupational title.

Cooperative Work Experience Coordinator

1 Be completely aware of the modular design concept right from its inception, in his school, so that he is capable of answering student questions which might come up.

2 Meet with the teacher and advisory committee to assist in the development of the list of occupational titles available for the school area. Assist in the selection of modules for each occupational title to make up the occupational title cards.

3 Schedule work experience modules at appropriate times during the student's course. This would be after the student has mastered the basic skills at the school in cooperation with the instructors.

4 Work with employers to see if the modules taken by the student are the ones needed to obtain the skills required for that occupation.

Curriculum Coordinator

1 Be completely aware of the modular design concept from its inception, in his school, so that he is capable of answering student questions which might come up.

2 Work with the teacher in establishing an advisory committee for his curriculum area.

3 Set up a meeting of the advisory committee, teacher, guidance personnel, and administration to review the modular design program and coordinate their efforts toward the development of the occupational program cards for your school. (Titles with the appropriate modules to be taught for that title).

4 Work with and coordinate the efforts of the teacher and guidance personnel in meeting with next year's students to orient them to the modular curriculum program.

5 Work with teachers in tabulating the modules that are most frequently requested when the occupational title cards are tabulated.

6 Coordinate the scheduling of the appropriate modules into teacher schedules for the following year.

7 Help in the writing of any special modules needed for the content area which are not available from the Education Department.

8 Make sure that teachers have the necessary equipment to teach the modules that are scheduled.

9 Work with the administration for the speedy return of any equipment that must be sent out for repair that is presently being used in teaching a module.

Agriculture Advisory Committee

1 Review the modular curriculum design to determine the role the committee will be playing in the total program.

2 Review their area and establish a list of occupations that students may find employment in after completing their occupational training.

3 Evaluate each occupational title listed above and establish which modules a student should take to develop the skills necessary to work in that occupational field. (Occupational program card)

4 Assist in establishing a list of work experience stations.

5 Evaluate the curriculum program twice a year to insure that it follows the occupational needs of the community.

6 Advise the teacher on new and different equipment that should be available for the teaching of the modules which parallels equipment the student will be using after graduation.

## CONDUCTING THE MODULAR DESIGN PROGRAM

The modular design demands considerable effort on the part of the teacher. This effort is highlighted in the preparation stages of the module presentation.

### PREPARATION

1 The teacher previews the content of the module in relation to the objectives.

2 The teacher assesses the entire module to assure that it meets the needs of the particular area.

3 In previewing the module, the teacher must keep in mind not only his or her ability to teach but also:

a physical facilities available

b equipment and supplies available

c time of year the module is to be offered

d number of students enrolled

4 This preview will also allow the teacher to determine the core objectives which most students will be able to accomplish.

5 The teacher should make certain that

a all physical facilities, equipment, and supplies are ready before the module is taught

b all resource and teaching aids are prepared and ready

c all field trips and other off-school property activities are scheduled in advance

d evaluation materials such as quizzes, supplies, and forms are ready

e all student progress reports are ready

### MODULE INTRODUCTION

On the first day of the module, the teacher should meet with students to:

1 Provide to and discuss with the class the core list of objectives to be accomplished, this could be on a form like the example on page 31.

2. Indicate the performance level expected in attaining the additional objectives

3 Discuss with each student a list of objectives he or she should attempt to attain in addition to the core of class objectives.

4 Discuss with each student the acceptable performance level

Establishing a list of objectives for each student maximizes the individualizing of the program. Each student enrolled in a module will have a tailored program which will allow for student differences such as physical or mental handicaps, demonstrated skills for certain objectives, and supervised work experience which may be conducted at the same time.

## WORK EXPERIENCE

The most successful modular design programs have supervised work experience arranged for each student. This part of the program is best planned, conducted, and evaluated with the administration, advisory committee, students, teacher(s), and work experience coordinator acting in joint effort. The location and availability of work experience for students should be reported to the teacher and/or cooperative work experience coordinator by the members of the advisory committee. Further contact and establishment of students in these locations is the job of the teacher and/or coordinator with time allowance and other considerations granted by the administration. Remembering that the students' goal has been established as realistically as possible through the modular design sessions, every effort must be made to place students in appropriate work experience stations.

There are many ways that work experience programs can be integrated into the student's individual schedule. A module or series of 3-week modules may be integrated whenever it best meets the needs of the student. Information for setting up these experiences is found in a recent New York State Education Department publication, Cooperative Occupational Education Programs Administrative Handbook, produced by the Office of Occupational Education, Albany, New York 12224.

## YOUTH LEADERSHIP DEVELOPMENT ACTIVITIES

A complete instructional program in agriculture utilizes formal related instruction, supervised work experience, and youth leadership activities to meet student needs. Youth leadership activities are an integral part of each module's instructional content and student activities. Specific modules regarding youth leadership are available; however, each teacher is expected to emphasize these activities in daily instruction and supervision of work experience.

## EVALUATING MODULAR DESIGN PROGRAM

### STUDENT ACCOMPLISHMENT

Each student's list of objectives combined with the skills taught in the module form a basis for assessment. Assessment is made constantly, keeping in mind individual differences in ability and experience. A record should be kept as each student performs individual skills and displays competency in terms of meeting the specific objectives. The continuous record will evolve into a list of competencies possessed by the student. (See sample form #1, page 31.) This list may be used in several ways.

- Self-evaluation for the student
- Permanent record for the guidance office
- Realistic report to parents
- Record for use in securing work experience and employment
- Record for employers

### MODULE EVALUATION

Many modules will be used for the first time by individual teachers. Each teacher should complete the Module Evaluation Form #2 (page 32) at the end of each 3-week period. It will be necessary to note additions and corrections which will more specifically adapt the module to the local program. Where specific deficiencies are noted this information should be sent to the Bureau of Agricultural Education.

Students completing individual modules should be asked to complete the Module Evaluation Form #3 (page 33). This allows a check on whether the material in the module is pertinent to the student and his occupational goals. Whenever the cumulative reports from students indicate a dissatisfaction with a module it should then be reviewed for possible revision. There will be occasions when a module may be unpopular but still necessary to prepare the student for his occupational goal.

### PROGRAM EVALUATION

In addition to evaluating individual modules it is important to look at the total program. It is recommended that periodic meetings be held among the teacher(s) of agriculture and representatives from the guidance staff, administration, parents, students, and advisory committee to review the following aspects of the program.

- Student orientation procedures
- Module selection
- Module scheduling
- Module evaluation
- Work experience program
- Job placement
- Equipment needs
- Facilities

Individual evaluations by students and teachers may be useful in the meetings. Students should be encouraged to complete the Student Modular Program Evaluation Form #4 (page 34) at two different times, mid-year and at the end of the school year.

Form "Teacher Evaluation Modular Program", (page 36) should be completed by the teacher. This form provides a self-evaluation of the program.

Sample Form #1

01.0305-03

*Student Evaluation Sheet:* Advanced Agriculture Welding Module

Each student will develop and demonstrate the effective ability to do the following:

1 Perform five vertical down welds 3" or longer using a blue dot electrode.

2 Perform five vertical up welds 3" or longer using a blue dot electrode.

3 Perform three overhead welds 3" or longer using a blue dot electrode.

4 Use the carbon arc torch as a source of heat to bend a test plate as directed.

5 Demonstrate hard surfacing using the arc welder by doing the following:

3 layer figure "S"_____

3 layer crescent_____

wash pass_____

6 Use the oxyacetylene unit to braze a test plate according to specifications.

7 Demonstrate soldering using the following sources of heat as directed.

carbon arc_____

oxyacetylene_____

soldering iron_____

8 Weld cast iron according to the instructors specifications.

9 Cut cast iron using the arc welder while being observed by the instructor.

Attendance: Excellent Good Poor

Cooperation: Excellent Good Poor

Comments

Name_____

Grade for module_____

Completion date_____

Sample Form #2

*Teacher Module Evaluation*: Check List for Modules Used

School _____ Date _____

Teacher _____

Module Title _____ Code _____

How Used (circle) - Group Individual Instruction Combination

Dates Used From _____ to _____

| Check (✓) the column most applicable to each item. (If the item is checked - Needs Improvement, please explain this under Comments, referring to the item by number.) | Strong Aspects | Needs Improvement |
|---|---|---|
| 1 Organization of module | | |
| 2 Description was accurate and appropriate | | |
| 3 Units - a logical division of the module | | |
| 4 Time allocation is reasonable in each unit | | |
| 5 Objectives | | |
| a are written in performance terms | | |
| b detailed sufficiently | | |
| 6 Content | | |
| a relates to objectives | | |
| b detailed sufficiently | | |
| 7 Teaching Method | | |
| a appropriate methods are recommended | | |
| b detailed sufficiently | | |
| 8 Student Activity | | |
| a detailed sufficiently | | |
| b appropriate activities are suggested | | |
| 9 Evaluation Procedures | | |
| a detailed sufficiently | | |
| b each objective has an evaluation procedure | | |
| c appropriate procedures suggested | | |
| 10 Reference Materials | | |
| a sufficient materials were suggested | | |
| b was of sufficient depth for teachers | | |
| c student level materials were available | | |

Sample Form #3

*Student Module Evaluation:* _____

| | | Yes | No |
|---|---|---|---|
| 1. | Did the content of the module meet your needs? | ___ | ___ |
| 2. | Were the modules organized properly? | ___ | ___ |
| 3. | Did you have adequate time to complete the work? | ___ | ___ |
| 4. | Were adequate references made available? | ___ | ___ |
| 5. | Were the references used to complete the modules current and organized so that a learner could use them easily? | ___ | ___ |
| 6. | Were adequate tests given? | ___ | ___ |
| 7. | Was homework checked and returned by the teacher in a reasonable length of time? | ___ | ___ |
| 8. | Was release time from school to actually work in the field "learn by doing" beneficial to you? | ___ | ___ |
| 9. | Did the teacher follow up closely enough on your working during release time? | ___ | ___ |
| 10. | Were resource people used to good advantage? | ___ | ___ |
| 11. | Were adequate field trips arranged for and conducted? | ___ | ___ |
| 12. | Were the modules meaningful to you as a learner? | ___ | ___ |
| 13. | Did the modules have carryover values for salable skills in occupational work? | ___ | ___ |
| 14. | Did the modules provide for needs of students who wish to go further to school - 2 year agricultural and technical colleges or 4 year colleges? | ___ | ___ |
| 15. | Do you feel that this concept is desirable and should be continued? | ___ | ___ |

## Sample Form #4

*Student Modular Program Evaluation*

School _____ Date _____

| Check (✓) the column most applicable to each item. (If the item does not exist, or does not apply please explain this under Comments, referring to the item by number.) | Strong Aspect | Needs Improvement |
|---|---|---|
| 1. Received appropriate orientation and information about the modular design of the agriculture program | | |
| 2. Received counseling in regard to | | |
| a) occupations available in agriculture | | |
| b) modules available in agruculture at this school | | |
| c) work experience stations available | | |
| 3. Scheduled into appropriate modules - based on occupational objective | | |
| 4. Received program card (list of modules with dates offered) for fall-winter semester (first 20 weeks) beginning in September | | |
| 5. Received program card for winter-spring semester (second 20 weeks) | | |
| 6. Enrolled in only those modules listed that are appropriate to my occupational objective | | |
| a) previewed each module's objectives | | |
| b) agreement with instructor was reached about objectives to be accomplished in each module attempted | | |
| c) sufficient time was available to complete objectives | | |
| d) final evaluation of student's accomplishments was completed by the end of each module attempted | | |
| 7. Modules completed: | | |
| a) organized properly | | |
| b) made written comments | | |
| c) objectives were appropriate | | |
| d) descriptions were appropriate with material covered | | |
| e) reference materials were available | | |
| f) reference materials were appropriate | | |
| g) field trips were beneficial | | |
| h) learned new skills | | |

Student Evaluation

| | Strong Aspect | Needs Improvement |
|---|---|---|
| 8. Parents have been informed of -<br>a) my progress (accomplishments) in each module<br>b) the total design and purpose of the program | | |
| 9. The objectives of module have been used as a report card for the -<br>a) school<br>b) prospective employers<br>c) parents | | |
| 10. The modular concept is desirable and should be continued | | |

COMMENTS:

Sample Form #5

*Teacher Modular Program Evaluation*

| Check (✓) the column most applicable to each item (If the item does not exist, or does not apply in your school system, please explain this under Comments, referring to the item by number.) | Strong Aspect | Needs Improvement |
|---|---|---|
| **Modular Design** | | |
| 1. People who were present at a presentation of the modular program: | | |
| . Administrator | | |
| . Guidance | | |
| . Teacher of Agriculture | | |
| . Advisory Committee member | | |
| . Student | | |
| . Other | | |
| 2. The teacher met with his advisory committee to: | | |
| . review objectives of the modular system | | |
| . list occupations available in the service area of the school system | | |
| . list work experience stations that would be available to students | | |
| . list most appropriate modules under each occupation identified | | |
| 3. The teacher and guidance personnel met to discuss the modular program with: | | |
| . students already in agricultural classes | | |
| . other students indicating an interest in agriculture | | |
| 4. The teacher and guidance personnel met with prospective students concerning: | | |
| . agricultural program available | | |
| . modular design | | |
| . agricultural occupations available | | |
| . modules available to coincide with occupations | | |
| 5. The teacher and guidance personnel met with prospective students to: | | |
| . ascertain student's occupational objectives | | |
| . outline modules needed to attain occupational goal | | |
| . fill out each student's modular program | | |
| 6. The teacher and guidance personnel tallied all programs completed by students to arrange teacher's yearly schedule . | | |

Check (✓) the column most applicable to each item.
(If the item does not exist, or does not apply, in your school system, please explain this under Comments, referring to the item by number.)

| | Strong Aspects | Needs Improvement |
|---|---|---|
| **Modular Design** (continued) | | |
| 7. The administration, guidance personnel, and teacher decided which modules were to be offered for the first half year on: | | |
| . student program card requests ..... | | |
| . most appropriate time of year to offer ..... | | |
| . physical facilities available..... | | |
| . equipment and supplies available ..... | | |
| 8. The thirty hour modules are completed in ____ class days ... | | |
| 9. Provisions for recycling students who do not complete objectives of a module have been made ..... | | |
| 10. Modules are being used in the continuing education program . | | |
| 11. Evaluation of student progress occurs during each module based on behavioral objectives ..... | | |
| 12. The teacher makes appropriate revision in each module ..... | | |
| 13. Students move from one module to the next regardless of the teacher involved ..... | | |
| 14. Each student is enrolled only in modules that were indicated on program card ..... | | |

Comment:

Signature _____

School _____

Date _____

## CLASSIFICATION SYSTEM FOR MODULES

The Classification System for Modules is an index which provides:

- an explanation of the classification system
- descriptive statements of the types of modules in each category
- a complete listing of modules which have been prepared to date

Persons planning to use the modular design will need to be familiar with the classification system.

### Explanation of Classification System

This directory is organized following the classification of vocational-technical education programs which appears in the Standard Terminology for Curriculum and Instruction in Local and State School Systems,[1] related to codes, titles, and worker trait groups in the Dictionary of Occupational Titles, Third Edition.[2]

The coding system is intended to provide an identity for each of the classified items included in the program of agriculture. These identification codes may be helpful in the storage and retrieval of occupational information and instructional materials.

Seven vocational-technical areas have been identified and given two digit codes. The area of agriculture carries the code 01. The area of agriculture is comprised of eight major groups of subject matter. These are organized for carrying on learning experiences concerned with preparation for or upgrading in, occupations requiring knowledge and skills in agricultural subjects.

The major groups are given four digit codes as indicated below:

01.01 Agricultural Production
01.02 Agricultural Supplies and Services
01.03 Agricultural Mechanics
01.04 Agricultural Products
01.05 Ornamental Horticulture
01.06 Agricultural Resources
01.07 Forestry
01.99 Other

---

1 U. S. Office of Education, Standard Terminology for Curriculum and Instruction in Local and State School Systems. State Education Records and Reports Series: Handbook VI. Washington, 1969

2 U. S. Department of Labor, Dictionary of Occupational Titles, Third Edition, Volumes I and II. Washington: U. S. Printing Office, 1965

These major groups are further divided into sub-groups each of which is given a six digit code. For example, Animal Science is an instructional area which is a subdivision of Agricultural Production and carries the four digit code of Agricultural Production - 01.01, plus an additional two digits as follows:

Animal Science 01.0101

In a few instances, primarily in Agricultural Production, further subdivisions are identified by eight digit codes, for example, LIVESTOCK AND POULTRY is a subdivision of ANIMAL SCIENCE and carries the code,

LIVESTOCK AND POULTRY 01.010101

A further sub-division of LIVESTOCK AND POULTRY is

DAIRY CATTLE 01.01010101

Modules of instruction are identified with appropriate instructional groups by carrying the code of the subgroup plus a two digit code preceded by a dash. An example of this is the coding of a module of instruction under LIVESTOCK AND POULTRY and DAIRY CATTLE:

01.01010101-01 PRODUCING QUALITY MILK

In summary, the code is interpreted as follows:

First 2-digit position: subject matter AREA
Example: 01. *AGRICULTURE*

Second 2-digit position: MAJOR GROUP of subject matter
Example: 01.01 *AGRICULTURAL PRODUCTION*

Third 2-digit position: the SUB-GROUP
Example: 01.0101 *ANIMAL SCIENCE*

Fourth 2-digit position: the SUB-SUB GROUP
Example: 01.010101 *LIVESTOCK AND POULTRY*

Fifth 2-digit position: the DETAILED SUB-SUB GROUP
Example: 01.01010101 *DAIRY CATTLE*

Sixth 2-digit position following hyphen: Module of Instruction associated with the SUB-SUB GROUP or SUB-GROUP
Example: 01.01010101-01 *PRODUCING QUALITY MILK*

The course or instructional program for each student may be constructed of modules selected from various major groups of agricultural instruction appropriate to his or her occupational objective.

## MODULE INDEX

### Agricultural Production

01.01 AGRICULTURAL PRODUCTION
Subject matter and learning activities which are concerned with the principles and processes involved in the planning related to and the economic use of facilities, land, water, machinery, chemicals, finance, and labor in the production of plant and animal products. Activities include classroom instruction and laboratory experiences in and out of school, including farms, ranches, and other agriculturally related establishments.

01.0101 ANIMAL SCIENCE
Planned learning experiences which are concerned with the study and operations dealing with theories, principles, and practices involved in producing (breeding, feeding, care, and housing) animals and animal products for economic and other uses.

01.010101 LIVESTOCK AND POULTRY
Organized subject matter and experiences designed for the study of and application to various major livestock enterprises. The following as frequently studied, but are not defined here because of their commonly understood description.

01.01010101 DAIRY CATTLE
-01 Producing Quality Milk
-02 Dairy Cattle Breeding
-03 Feeding Dairy Cattle
-04 Dairy Health and Disease
-05 Managing the Milking Herd

01.01010102 BEEF CATTLE
-01 Beef Production

01.01010103 HORSES
-01 Handling the Foal
-02 Harness Training of Horses
-03 Care of Tack and Equipment
-04 Care of Feet and Legs

01.01010104 SWINE
-01 Swine Production

01.01010105 SHEEP
-01 Sheep Production

01.01010106 POULTRY
-01 Poultry Production

01.01010107 SMALL AND LABORATORY ANIMALS

01.0101010701 DOGS AND CATS
-01 Selecting and Handling Dogs and Cats
-02 Basic Dog Grooming
-03 External Parts of the Dog
-04 Training Dogs

01.0101010702 OTHER SMALL ANIMALS
-01 Care of Birds
-02 Care and Maintenance of Tropical Fish
-03 Care and Handling of Reptiles and Amphibians
-04 Care and Handling of Small Animals
-05 Handling of Primates

01.0101010703 SANITATION, HEALTH, AND DISEASES
-01 Internal Parasites of Animals
-02 External Parasites of Animals
-03 Emergency Care of Animals
-04 Bathing, Dipping, Dusting, and Handling of Wet Animals

01.0101010704 LABORATORY PROCEDURES
-01 Sterilization, Disinfection, and Sterile Packs
-02 Assisting in Surgical Procedures
-03 Radiological Techniques
-04 Hematology and Urine Analysis
-05 Anesthesia and Euthanasia
-06 Laboratory Techniques - Small Animals

01.0101010705 MANAGEMENT
-01 Legal Rights, Transporting, and Housing of Animals
-02 Genetics and Breeding of Small Animals
-03 Feeds and Nutrition for Small Animals
-04 Repair of Equipment

01.01010199 INSECTS AND ARTHROPODES
-01 Care and Growing of Insects

01.010102 NUTRITION
The study of the relationship of proteins, fats, carbohydrates, water, minerals, and vitamins in the production of meat, milk, eggs, and wool.
-01 Feeds and Feeding

01.010103 GENETICS
The study of the principles of inheritance and their applications for the improvement of animals through breeding and selection.
-01 Planning a Breeding Program (Livestock)

01.010104 PHYSIOLOGY
A study of the body processes and functions related to annual production such as lactation, reproduction (including artificial insemination and heat detection), egg production, digestion, growth, wool production, and other body processes and functions.

01.010105 ANIMAL HEALTH
The study of environment, drugs, antibiotics, vaccinations, blood tests, and other management factors in the prevention and control of diseases.
-01 Maintaining Livestock Health

01.010106 PRODUCTION MANAGEMENT
A combination of subject matter and experience concerned with operating and managing a commercial unit involving a specific class of animals.

01.01010601 FEEDING PRACTICES
A study of the "least-cost" combinations of feed ingredients for achieving maximum performance.

01.01010602 HOUSING PRACTICES
A study of the housing and other environmental needs of a specific kind of animal.
-01 Livestock Housing

01.01010699 OTHER PRACTICES
-01 Selection, Registration, Fitting, and Showing of Foundation and Replacement Stock
-02 Management of Young Dairy and Beef
-03 Raising Dairy Beef

01.0102 PLANT SCIENCE
Planning learning experiences which are concerned with the study and operations dealing with principles and practices involved in the culture and production of agricultural plants.

01.010201 CROPS
Organized subject matter and experiences designed for the study of and application to various major crop enterprises. Among the considerations emphasized in instruction are genetics, nutrition, soils, plant pathology, automology, and disease and pest control.

01.01020101 CEREAL GRAIN CROPS

01.01020103 FORAGE CROPS
-01 Planning the Cropping Program
-02 Growing the Crop
-03 Harvesting Field Crops
-04 Storing the Field Crop
-05 Weed Control in Field Crops

01.01020104 OIL CROPS

| | |
|---|---|
| 01.01020105 | TREE FRUIT AND NUT CROPS<br>-01 The Cultural and Management Practices of the Apple Orchard<br>-02 Controlling Apple Diseases<br>-03 Controlling Apple Insects<br>-04 Harvesting, Marketing, and Storage of the Apple Crop |
| 01.01020106 | SMALL FRUIT CROPS |
| 01.01020107 | VEGETABLE CROPS<br>-01 Producing Vegetable Crops for Processing<br>-02 Snap Bean Production |
| 01.010202 | SOILS - (see 01.06 AG RESOURCES: 01.0603 SOIL) |
| 01.010203 | NUTRITION |
| 01.010204 | GENETICS |
| 01.010205 | PHYSIOLOGY |
| 01.010206 | PATHOLOGY |
| 01.010207 | ENTOMOLOGY |
| 01.010208 | DISEASE AND PEST CONTROL<br>-01 Plant Disease Control<br>-02 Plant Insect Pest Control |
| 01.01020801 | INSECTICIDES |
| 01.01020802 | FUNGICIDES |
| 01.01020803 | HERBICIDES |
| 01.01020804 | RODENTICIDES |
| 01.01020805 | NONCHEMICAL CONTROLS |
| 01.01020806 | PLANT GENETIC RESISTANCE |
| 01.0103 | FARM MECHANICS (See 01.03 AG MECHANICS) |
| 01.0104 | FARM BUSINESS MANAGEMENT<br>Planned learning activities which are concerned with farm resource analysis, accounting, production, financing, resource acquisition, purchasing, farm inputs, performance records, contracts, farm marketing; and maintenance. The results of these learning activities are applied to formulating decisions involved in managing a farm or ranch operation. |

01.010401 FARM ACCOUNTS
Subject matter and experiences concerned with accounting as applied to the various enterprises in agricultural production.
-01 Farm Business Records

01.010402 PERFORMANCE RECORDS
Planned study and experiences concerned with the use of records in determining the efficiency of a production operation, e.g., yilds per acre, pounds of milk per cow, and labor efficiency.
-01 Using Livestock Records to Improve Production

01.010403 BUDGETING AND ANALYSIS
Subject matter and learning experiences involving the use of quantitative input-output relationships, costs and price expectations to secure optimum economic returns to the enterprises of the commercial agricultural unit or the farm as a whole.
-01 Farm Business Analysis
-02 Planning Farm Power Machinery and Equipment Needs

01.010404 MANPOWER UTILIZATION
The study of the factors that contribute to efficient and economic use of labor resources and the implications of these factors for labor management decisions of the farm manager. Emphasis in instruction is on such considerations as the development of knowledge about and ability to work with agricultural manpower; employee-selection; employer-employee relations; wages and working conditions; legal requirements; and conditions affecting the employer, e.g., education, health, and language barriers.
-01 Farm Labor Management

01.010405 PURCHASING AND MARKETING
The study of:
1) acquiring input units such as livestock, feed, seed, fertilizer, machinery and equipment, and
2) marketing as applied to animal and plant products
-01 Marketing Farm Products
-02 Marketing Livestock Products

01.010406 FINANCIAL AND LEGAL MANAGEMENT
The study of factors involved in the control and application of the financial and legal aspects of managing a commercial agricultural production business.
-01 Starting a Farm Business
-02 Reorganizing a Farm Business
-03 Farm Business Insurance
-04 Farm Business Law

Agricultural Production

01.010407 FARM ORGANIZATIONS
Subject matter concerned with a comprehensive study of current programs of the several national, regional, and local farmers' organizations - including their development and purposes.
-01 Farm Organizations

01.010408 GOVERNMENT PROGRAMS
The study of current government policies, regulations, and programs available to and having influence upon agricultural production and management, farm prices, and income of people involved in agriculture.
-01 Government Programs for Farmers

01.010499 OTHER
-01 Using Service Agencies

Agricultural Supplies and Services

01.02 AGRICULTURAL SUPPLIES/SERVICES
Subject matter and learning experiences concerned with preparing students for occupations involved in providing consumable supplies used in the production phase of agriculture, including processing, marketing, consulting and other services.

01.0201 AGRICULTURAL CHEMICALS
The study of a variety of chemicals, drugs, and related products which are associated with the production of animals and plant products. Usually included for study are various types of chemicals used to prevent, control, or cure animal and plant diseases and to control pests.
-01 Sales of Chemicals for Agricultural Use

01.0202 FEEDS
The study of the business of processing and distributing feeds and feedstuffs.
-01 Sales of Feeds and Feedstuffs

01.0203 SEEDS
The study of the business of producing, processing, and distributing seeds.
-01 Sales of Seeds and Plants

01.0204 FERTILIZERS (PLANT FOODS)
The study of the principles concerned with the analysis, sale, and application of chemical elements known to be necessary for plant growth.
-01 Sales of Fertilizers

01.0205 ADVERTISING SERVICES
Organized subject matter and learning experiences related to planning, development, placement, and evaluation tasks performed by agricultural education employees and management personnel in demand creation and sales promotion activities utilizing display, merchandising aids, and mass media in such enterprises as advertising agencies, display houses, retail and wholesale establishments, and production industries.
-01 Display and Advertisement of Agricultural Products
-02 Advanced Advertising in Agriculture
-03 Agricultural Product Salesmanship

01.0206 ACCOUNTING - BOOKKEEPING
Planned learning experiences which include a combination of courses and practical experiences concerned with systematizing information about transactions and activities into accounts and quantitative records, and paying and receiving money.
-01 Recordkeeping I for Agricultural Business
-02 Recordkeeping II for Agricultural Business
-03 Analyzing Agricultural Business Records

01.0207 PERSONNEL
Planned learning experiences which include a combination of courses and practical experiences concerned with personnel administration of an organization and the facilitating functions of scheduling and conducting clerical work, management, and operations of organizations.
-01 Securing Employment-Employee Responsibilities

01.0208 FARM AND GARDEN SUPPLIES AND EQUIPMENT
Organized subject matter and learning experiences related to a variety of sales and sales-supporting tasks performed by employees and management personnel in establishments engaged primarily in selling supplies and equipment for farm and garden.
-01 Buying and Selling Agricultural Products
-02 Farm, Home and Garden Supplies Sales

01.0209 FOOD DISTRIBUTION
Organized subject matter and learning experiences related to a variety of sales and sales-supporting tasks performed by employees and management personnel in establishments primarily engaged in selling food for home preparation and consumption, or selling a general or commodity line of food products at wholesale.

01.0210 PETROLEUM
Organized subject matter and learning experiences related to the variety of sales and sales-supporting tasks performed by employees and management personnel in retail or wholesale establishments engaged in the distribution of petroleum products.
-01 Sales of Petroleum Products and Accessories

## Agricultural Supplies and Services

01.0211 MANAGEMENT

Learning activities and experiences concerned with various responsibilities such as (1) studying policies, organizational structures, and administrative practices of agriculturally related organizations, and (2) studying legal aspects, tax situations and insurance possibilities related to agricultural business.

-01 Organizational Patterns in Agricultural Business
-02 Cooperatives in Agriculture
-03 Finance and Credit Systems for Agricultural Business
-04 Insurance for Agricultural Businesses
-05 Income Taxes in Agriculture
-06 Legal Aspects of Agricultural Business

01.0299 AGRICULTURAL SUPPLIES/SERVICES, OTHER

Included here are other subject matter and experiences emphasized in agricultural supplies/services which are not listed above.

-01 Personal Financial Planning
-02 Computations in Agriculture
-03 Communications for Agriculture

## Agricultural Mechanics

01.03 AGRICULTURAL MECHANICS

A combination of subject matter and activities designed to develop abilities necessary for assisting with and/or performing the common and important operations or processes concerned with the selection, operation, maintenance, and use of agricultural power, agricultural machinery and equipment, structures and utilities, soil and water management, and agricultural mechanics shop, including kindred sales and services.

01.0301 AGRICULTURAL POWER AND MACHINERY

A combination of subject matter and experiences designed to develop in pupils the abilities to (1) recognize and identify the fundamental principles of selection, operation, service maintenance, repair, and safety in agricultural power--engines, electricity, and hydraulics and (2) plan, install, service, assemble, adjust, operate, and repair farm machinery.

-01 Fundamentals of Ag Engines
-02 Small Engine Overhaul
-03 Small Gas Engine Service
-04 Lawn and Garden Tractors
-05 Tractor Service
-06 Tractor Engine Tuneup
-07 Tractor Engine Top Overhaul
-08 Tractor Fuel Systems (non-diesel)
-09 Tractor Engine Fuel Systems (diesel)
-10 Tractor Engine Ignition Systems

01.0301 (continued)

-11 Tractor Engine Overhaul-Disassembly
-12 Tractor Engine Overhaul-Reassembly
-13 Agricultural Power Train
-14 Farm Machinery Operation, Maintenance, and Field Repairs
-15 Setting Up Agricultural Machinery
-16 Agricultural Equipment Repair
-17 Agricultural Hydraulic Systems
-18 Tillage Equipment
-19 Planting, Spraying, Fertilizing Equipment
-20 Hay and Forage Equipment
-21 Grain Harvesting Equipment
-22 Agricultural Equipment Accessories
-23 Materials Handling Equipment
-24 Lawn and Garden Equipment
-25 Light Earthmoving Equipment Repair and Maintenance
-26 Milking Equipment
-27 Farm Tractor and Vehicle Operation
-28 Tractor Starting and Charging Systems

01.0302 AGRICULTURAL STRUCTURES AND CONVENIENCES
Learning activities designed to assist pupils in developing the ability to plan, select materials for, and construct and maintain agricultural structures and conveniences. (see also 16.010203 AGRICULTURAL STRUCTURES AND CONVENIENCES under TECHNICAL EDUCATION)

-01 Planning Agricultural Structures and Service Facilities
-02 Construction and Improvement of Agricultural Structures

01.0303 SOIL MANAGEMENT (SEE 01.0603)
A combination of subject matter and practical experiences designed to develop knowledge and skills concerned with surveying and classifying soils; determining cropping systems and fertilizer; conditioning; and cultural practices that will result in efficient agricultural production.

01.0304 WATER MANAGEMENT (SEE 01.0605)
A combination of subject matter and practical experiences designed to develop knowledge and skills concerned with surveying, planning, laying out, constructing, using, and maintaining irrigation, drainage, water conservation, runoff, and erosion control systems, and with maintaining proper soil-water-plant relationships.

01.0305 AGRICULTURAL MECHANICS SKILLS
Planned learning designed to develop skills, abilities, and judgments necessary to select, use, and maintain hand and power tools, arc and acetylene welders, and to plan and establish home farm shops.

-01 Shop Management and Equipment Utilization
-02 Basic Agricultural Welding
-03 Advanced Agricultural Welding
-04 Agricultural Machinery Painting

Agricultural Mechanics

01.0306 AGRICULTURAL CONSTRUCTION MAINTENANCE
A combination of subject matter and experiences designed to develop skills and abilities necessary in the planning, layout, fabrication, and maintenance of farm and other agricultural equipment, especially small, custom-built devices.
-01 Planning, Layout,and Fabrication of Custom Equipment

01.0307 AGRICULTURAL ELECTRIFICATION
A combination of subject matter and experiences designed to provide opportunities for pupils to gain the knowledge and understanding necessary to make effective use of electricity and electrical equipment on farms, ranches, and other agricultural establishments. Included for study are the principles of electricity, maintenance and operation of equipment, and safety factors related thereto.
-01 Electrical Fundamentals for Agriculture
-02 Using Electricity in Agriculture

01.0308 MANAGEMENT OF MACHINERY DEALERSHIPS
A combination of subject matter and experiences designed to enable students to assume responsibilities and progress in the management phases of the equipment business. Included for study are records, facility layout, financing, purchasing, cost control, customer relations and employee relations.
-01 Managing Dealership Parts Department
-02 Managing an Agricultural Machinery Service Department

01.0399 AGRICULTURAL MECHANICS, OTHER

Agricultural Products*

01.04 AGRICULTURAL PRODUCTS
(PROCESSING, INSPECTION AND MARKETING)
A combination of subject matter and learning experiences designed to teach information, processes, scientific principles and management decisions concerned with agricultural competencies in the food and non-food technology occupations. The groups of food products include (1) meat, fish, poultry and eggs; (2) dairy products; (3) fruits and vegetables; (4) cereal grains, and (5) other foods and beverages. The non-food products include cotton, tobacco, and wool. Instruction may be provided in any or all groups of these products.

*No modules developed yet.

## Agricultural Products

01.0401 FOOD PRODUCTS
A combination of subject matter and learning experiences concerned with the scientific principles and operations involved in the preparation of agricultural products for sale and consumption, including home and institutional preparation of food and its nutritive value.

01.040101 DAIRY PRODUCTS
A combination of subject matter and practical experiences concerned with information, processes, science, and decisions associated with milk and products derived from milk, e.g., cream, ice cream, butter and cheese.

01.0402 NONFOOD PRODUCTS
A combination of subject matter and experiences concerned with the information, scientific principles, processes and marketing functions associated with nonfoof products such as cotton, tobacco and wool, as well as the industrial nonfood uses of grains and oilseeds.

01.0499 AGRICULTURAL PRODUCTS, OTHER
Included here are organized subject matter and practical experiences emphasized in agricultural products processing, inspection, and marketing which are not classifiable or listed above.

## Ornamental Horticulture

01.05 ORNAMENTAL HORTICULTURE (PRODUCTION, PROCESSING, MARKETING, AND SERVICES)
Organized subject matter and practical experiences concerned with the culture of plants used principally for ornamental or esthetic purposes. Instruction emphasized knowledge and understanding important to establishing, maintaining, and managing ornamental horticulture enterprises.

01.0501 ARBORICULTURE
Organized subject matter and practical experiences concerned with the principles and practices involved in the culture and maintenance of woody plants used for decoration and shade purpose.
-01 Climbing, Limbing, and Felling
-02 Pruning Ornamentals

01.0502 FLORICULTURE AND FLORISTRY
Organized subject matter and practical experiences which are concerned with principles and practices involved in field or greenhouse production of flowers and the arrangement of such flowers for ornamental purposes.
-01 Floral Design and Construction
-02 Funeral Spray and Wreath Construction

01.0502 (continued)
- -03 Funeral Designs
- -04 Simple Wedding Design
- -05 Producing Christmas Decorations
- -06 Retail Flower Shop Operation and Management

01.0503 GREENHOUSE OPERATION AND MANAGEMENT
Organized subject matter and practical experiences which are concerned with the principles and practices involved in producing plants under glass and in other artificial environments.
- -01 Introduction to Growing Greenhouse Crops
- -02 Growing Bedding Plants
- -03 Growing Specialized Greenhouse Holiday Crops

01.0504 LANDSCAPING
Organized subject matter and practical experiences which are concerned with the principles and practices involved in locating, planting, and maintaining turf, plants, shrubs, or devices for the beautification of home grounds and other areas of human habitation and recreation.
- -01 Ornamental Horticulture Landscape Design
- -02 Constructing Landscape Features
- -03 Indoor Landscaping
- -04 Identifying and Using Indoor Foliage Shrubs
- -05 Implementing Landscape Plantings
- -06 Maintaining Woody Shrubs in the Landscape
- -07 Identification and Landscape Use of Herbaceous Plants

01.0505 NURSERY OPERATION AND MANAGEMENT
Organized subject matter and practical experiences which are concerned with the production of turf, plants, and/or trees for the purpose of transplanting or propagating them.
- -01 Growing Nursery Plants
- -02 Asexual Plant Propagation
- -03 Plant Propagation from Seed

01.0506 TURF MANAGEMENT
Organized subject matter and practical experiences which are concerned with the principles and practices involved in establishing, managing and maintaining grassed areas for ornamental and/or recreational purposes.
- -01 Growing and Caring for Turf Grass
- -02 Lawn Construction
- -03 Greenskeeping

01.0599 ORNAMENTAL HORTICULTURE, OTHER
Include here other organized subject matter and experiences emphasized in ornamental horticulture which are not listed above.

Ornamental Horticulture

01.0599 (continued)

-01 Controlling Insects, Diseases and Fertilization
-02 Preparing and Maintaining Ornamental Horticulture Soils
-03 Using Woody Plants in Ornamental Horticulture
-04 Developing an Ornamental Horticulture Business Layout
-05 Preparing Nursery Stock for Sale
-06 Operating and Maintenance of Horticultural Equipment
-07 Scheduling Greenhouse Crop Production
-08 Preparing Flowers for Sale

Agricultural Resources

01.06 AGRICULTURAL RESOURCES (CONSERVATION, UTILIZATION & SERVICES)
A combination of subject matter and planned learning experiences concerned with the principles and processes involved in the conservation and/or improvement of natural resources such as air, forests, soil, water, fish, plants, and wildlife for economic and recreational purposes. Instruction also emphasizes such factors as the establishment, management, and operation of forest lands for recreational purposes.

01.0601 FORESTS
A combination of subject matter and experiences concerned with forests as living communities of plants and animals in which trees are the dominant species. Emphasis is on the multiple use of forest lands and resources.

-01 Maintenance and Management of Forest Plantations
-02 Management of Timber Stands

01.0602 RECREATION
The study of recreation as one of the multiple uses of land, including emphasis of the principles of conservation. Included in instruction are examples of recreation activities which can be established, maintained and managed, such as fishing, picnicking, hunting, camping, and nature study.

-01 Campground Development and Management
-02 Summer Recreation Areas-Operation and Maintenance
-03 Winter Recreation Site-Operation and Maintenance

01.0603 SOIL
A combination of subject matter and practical experiences designed to provide opportunities for gaining knowledge and understanding concerning the principles and practices involved in maintaining soil stability and productivity, including the prevention of erosion, pollution, waterlogging, exhaustion of plant nutrients, and the accumulation of toxic salts.

01.0603 (continued)
-01 Soil Science
-02 Soil and Water Management
-03 Erosion Control
-04 Land Measurement
-05 Advanced Surveying
-06 Bulldozer Service and Operation
-07 Operation of Backhoe and Loader
-08 Construction and Maintenance of Access Roads
-09 Operation of Sanitary Landfills

01.0604 WILDLIFE (INCLUDING GAME FARMS AND HUNTING AREAS)
A study of the principles and practices involved in the prevention and/or improvement of wildlife such as game, fowl, and fish.
-01 Conservation Law
-02 Farm and Forest Game Management
-03 Wetland Game Management
-04 Wildlife Disease and Pest Control

01.0605 WATER
A combination of subject matter and practical experiences concerned with water conservation practices such as prevention of soil erosion, sedimentation, other pollution, seepage, and evaporation, flood control; aquatic weed control and the development, conservation, and management of water supplies for agricultural, domestic, industrial, and recreational purposes.
-01 Stream Management
-02 Water and Sewage Systems
-03 Collection of Water Samples
-04 Analysis of Water and Wastewater Samples I
-05 Analysis of Water and Wastewater Samples II
-06 Sewage Treatment Plant Operation I
-07 Water Treatment Plant Operation

01.0606 AIR
The study of air pollution, including the effects of agricultural activities on pollution, and the effects of pollution on plants and animals.
-01 Atmospheric Sampling of Stacks

01.0607 FISH (INCLUDING FARMS AND HATCHERIES)
A combination of subject matter and activities concerned with the propagation, rearing, stocking and management of fish in public and private waters.
-01 Fish Management

01.0699 OTHER
Include here other organized subject matter and experiences emphasized in agricultural resources which are not listed above, including emerging occupational areas in this category. (Specify)
-01 Leveling
-02 Conservation Structures-Masonry
-03 Conservation Structures-Carpentry
-04 Service and Repair of Conservation Equipment

01.07 FORESTRY (PRODUCTION, PROCESSING, MANAGEMENT, MARKETING & SERVICES)
A combination of subject matter and experiences concerned with the multiple use of forest lands and resources, including their management and protection.

01.0701 FORESTS
See 01.0601 for description

01.0702 FOREST PROTECTION
A combination of subject matter and activities designed to provide knowledge, understanding, and judgment concerning the behavior of enemies of the forest and their control.
-01 Forest Fire Control

01.0703 LOGGING (HARVESTING AND TRANSPORTATION)
Study, including observation and practical experiences concerned with the initial collective activities involved in harvesting trees as a crop and in terms of not interfering with other desirable uses of the forest.
-01 Harvesting Timber and Pulp
-02 Operation of Timber Harvesting Equipment
-03 Scaling and Marking Timber
-04 Timber and Log Conversion

01.0704 WOOD UTILIZATION
Organized subject matter and practical activities concerned with the many wood products of the forest. Emphasis in instruction is on the study of production, selection, grading, and marketing of forest material (wood) for multiple uses in conservation to consumer goods, e.g., paper, plywood, wallboard, plastics, and preservative-treated wood products.

01.0705 RECREATION
See 01.0602 for description

01.0706 SPECIAL PRODUCTS
Organized subject matter concerned with the production and marketing of special products, e.g., maple syrup, nuts, Christmas trees, and other products. Consideration is given to the great variety of products utilized in their natural states and/or manufactured from such products.
-01 Christmas Tree Production and Marketing
-02 Maple Syrup Production

01.0799 FORESTRY, OTHER
Include here other organized subject matter and activities emphasized in forestry which are not listed above. (Specify).

01.99 AGRICULTURE, OTHER
Included here is other organized subject matter and experiences emphasized in agriculture which are not listed or classifiable in one of the above categories.

01.9901 OCCUPATIONAL EXPERIENCE PROGRAMS
A combination of subject matter and experiences designed to develop in students an ability to plan, conduct and evaluate a program of work experience in accordance with the student's occupational objective.
(Refer to publication:
(Cooperative Occupational Education Programs
(Administrative Handbook
(The State Education Department

01.9902 LEADERSHIP DEVELOPMENT PROGRAMS
A combination of subject matter and other learning experiences which will involve each student in appropriate activities. These activities will include developing leadership and followership abilities, orientation to the youth leadership development program (FFA) and other special events.

-01 Developing Leadership in the Individual
-02 Group Leadership Techniques
-03 Organizing an FFA Chapter
-04 The FFA Organization I
-05 The FFA Organization II
-06 FFA Activities and Awards
-07 Parliamentary Procedure

The companion publication *Module Directory for Agricultural Education* contains descriptions and major units of instruction for each of the developed modules available at the time of printing.

Teachers or administrators should check the Module Directory before requesting copies of modules for implementation. Assistance can be requested for local development of modules not available.